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ABSTRACT

This handbook provides suggestions about quality control procedures that will enable Teacher Corps project personnel to assess the effects and success of educational products, practices, and other outputs prior to dissemination. Two assessment processes are outlined. The first, review, is the collegial ongoing process for Teacher Corps project personnel to assess the effects and potential impact of innovations before dissemination. The second, validation, is the formal post-development process for Teacher Corps projects to assess the evidence of effectiveness for approval by an official panel. Guidelines and checklists for reviewing innovative products and practices are provided. The criteria used for validating an educational program are presented along with descriptions of the responsibilities of project personnel in the validating process. A format for submitting materials to a dissemination review panel is included as well as a description of panel criteria used for judging program effectiveness. (JD)

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Handbook for Review and Validation of Teacher Corps Products and Practices

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HANDBOOK FOR REVIEW AND VALIDATION

OF

TEACHER CORPS

PRODUCTS AND PRACTICES

January, 1981

FAR WEST LABORATORY FOR EDUCATIONAL RESEARCH AND DEVELOPMENT

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UNITED STATES DEPARTMENT OF EDUCATION
WASHINGTON, D.C. 20202

FOREWARD

Educators who consider adopting elements of the school improvement and educational professional development programs of Teacher Corps projects may reasonably expect evidence that a specific product, practice, or process really *works*. Teacher Corps project personnel will have to provide adopters with plausible information about their innovations that demonstrates both the credibility of supporting evidence and the educational significance of each product or practice.

Current Teacher Corps regulations require projects to develop specific objectives to achieve the adoption or adaptation of processes, practices, and products found useful in project schools to:

- Persons involved in the project;
- Schools of the local educational agency and components of the institution of higher education which are not involved in the project;
- Other local educational agencies, institutions of higher education, and communities; and
- Others interested in educational policy.

Toward this end, the staff of the Teacher Corps Dissemination Project has worked to identify quality control criteria for Teacher Corps projects to use in assessing the program elements that they choose to share with others.

This handbook represents a great deal of collaborative interaction by the contractor's staff and Teacher Corps project personnel, regional network staff, the Research Adaptation Cluster, the national program office, and specialists in educational assessment. The handbook, and the materials provided for projects in the Teacher Corps Dissemination Tool Kit, contain effective procedures and practical advise for project personnel striving to stimulate the adoption and adaptation of their innovations.

Teacher Corps projects are developing a number of exciting educational innovations for children in schools serving low income families. We want you to extend the benefits of these programs to schools throughout the country. This handbook should prove useful to you in assessing the educational significance and effectiveness of the products and practices that you share with others.

John D. Thomas

Director, Teacher Corps

PREFACE

At a time when there are literally thousands of innovative educational products and practices to choose among, the task of sorting through all of the possible alternatives is a formidable one indeed. The developers of innovations have to be ready to respond to the questions of potential adopters, including the following:

"Yeah, but, how do you know it <u>really</u> worked?"

"Yeah, but, how do you know it will work here?"

"Yeah, but, how do I know that <u>those</u> kids are like ours?"

Teacher Corps project personnel, as do all developers of innovative programs, have an obligation to be prepared to respond to these and to similar questions. It is necessary to collect data on the effects of an educational innovation, to document carefully its development, adaptation, and institutionalization in order to be able to respond in professionally adequate ways to potential adopters.

This handbook provides Teacher Corps project personnel with general guidelines for assessing educational products and practices. It may be used in the preparation of detailed procedures for assuring the quality of project-developed innovations locally prior to dissemination to other educators. In short, the handbook should make it more likely that Teacher Corps project personnel will be better able to respond to those "yeah, but . . ." questions as they disseminate their proven products and practices.

The handbook has been prepared to provide Teacher Corps project and national office personnel with information about alternatives for assessing educational products and practices. It provides criteria and procedures for reviewing and validating educational products and practices developed by Teacher Corps projects. A field-trial version of the handbook has been revised on the basis of feedback from project personnel.

We acknowledge the insights and contributions provided in the thoughtful reviews and critiques of background papers for the handbook by David L. Clark of Indiana University, Roy A. Edelfelt of the National Education Association, David D. Marsh of the University of Southern California, and our colleagues at the Far West Laboratory for Educational Research and Development: Bela Banathy, Paul Christensen, Paul D. Hood, Diane McIntyre, and Fred Rosenau.

We are grateful also for the information and advice provided by many members of the Teacher Corps in meetings of the Board of Directors of the Rocky Mountain Network, the Southeast Network, and the Southwest Network; in meetings with the Board of Directors and staff of the Research Adaptation Cluster; in personal discussions with staff personnel of Youth Advocacy Loop and the Executive Secretary of the Texas Network; and in telephone contacts with all regional network Executive Secretaries.

We particularly appreciate the advice and materials provided by Keith Acheson, Director, Teacher Corps Project at the University of Oregon; Sara R. Massey, Executive Secretary of the New England Network; Lee Morris, Executive Secretary of the Southwest Teacher Corps Network; Robert A. Mortenson, Executive Secretary of the Plains Network; Thomas Nagel, Director, Teacher Corps Project at San Diego State University; William M. Quirk, Director, Teacher Corps Project at Emporia State University; Robert Spaulding, Director, Teacher Corps Project at San Jose State University; and John Reed Williams, Executive Secretary of the California Teacher Corps Network. Susan L. Melnick, the project monitor at Teacher Corps Washington, helped us a great deal in shaping the handbook.

Editorial assistance was provided by Marilyn Woodsea and Julie McCullough; Ann Wallgren supervised the typing and layout of the manuscript.

James S. Eckenrod and Suzanne Hering

INTRODUCTION

Background

Since it began operations in 1966, the Teacher Corps of the U.S. Department of Education has been a major influence in teacher education in the United States. Over the years, many innovative programs have emerged as Teacher Corps projects sought to carry out program mandates to strengthen educational opportunities available to children from low-income families, to stimulate development of teacher preparation programs for teachers of children from low-income families, and to encourage institutions of higher education and local educational agencies to improve programs of training and retraining for teachers and teacher aides.

The 1976 amendments to the Higher Education Act of 1965 reflect the intent of Congress to increase (1) attention projects will give to improving the school/learning climate, and (2) emphasis on reforming the training and retraining of educational personnel, and to provide (3) greater focus on demonstration, documentation, institutionalization, and dissemination of the outcomes of Teacher Corps projects.

The current Rules and Regulations of Teacher Corps assign to projects the responsibility for taking steps to ensure the adoption or adaptation by other educational agencies and institutions of the products, practices, and processes that projects may develop. Teacher Corps project personnel are expected to develop objectives for stimulating adoption and adaptation of

their products and practices by demonstrating and disseminating them to:

1. Persons involved in the project;

2. Schools of the local educational agency and components of the institution of higher education not involved in the project;

3. Other local educational agencies, institutions of higher education, and communities; and

4. Others interested in educational policy.

It is to these outcomes and objectives that the Teacher Corps Dissemination Project addressed its attention. The project had two principal objectives:

1. To assist Teacher Corps in establishing an effective system for sharing information about products, practices, and other outputs within Teacher Corps, among projects and project personnel.

2. To design and pilot-test a process for validating and disseminating Teacher Corps products, practices, and other outputs to educational institutions and agencies throughout the country.

Dissemination: Broadly Conceived

In this handbook, dissemination is considered as a set of more or less discrete activities within the larger context of planned change in educational institutions. Within this context the "roles" of developer, documenter, evaluator, demonstrator, and so forth may seem to overlap with the activities of the disseminator. But in reality all are elements of an institutional configuration that enables individuals, who have personal commitment to school improvement, to extend and deepen the impact of their efforts. The planned change model, seen in the context of a Teacher Corps project, includes all the outreach activities that eventually lead to the adoption or adaptation of project-developed innovations--products, processes, and practices--by other educational agencies and institutions.

Thus, dissemination cannot be regarded as a separate task to be undertaken in the third or fourth year of a Teacher Corps project; it is an integral part of the process of planned change. Dissemination should be regarded as a two-way process--where the spread and exchange of information about educational innovations can facilitate choice among alternatives and contribute to effective implementation--that can assist Teacher Corps projects extend the impact of their programs beyond their local sites. When viewed as an integral part of school improvement and educational personnel development efforts, dissemination emerges very early and continues throughout the life of a project:

- During the needs assessment phase project personnel identify "targets" for improvement; this process also identifies the potential "audiences" for outreach efforts.
- Preparing project objectives involves the delineation of baseline conditions that will serve to measure change and for making claims about program effectiveness.
- A project's evaluation design provides parameters for defining levels of educational and experimental "significance", measures that provide data for establishing the plausibility of project effects.
- Implementing a school improvement or educational personnel development program (which may utilize resources or materials that have been identified through educational dissemination systems) provides documentation that can be used to assess program cost effectiveness, estimates of "transportability", and data of program effects on students and educational personnel.
- Institutionalization of project-developed innovations is, in effect, an outcome of dissemination efforts at the local level.
- Outreach is the natural extension of the planned-change process. Although in its early stages outreach may not involve a great deal of face-to-face contact with potential clients, it requires the same kinds of personal interaction and perseverence to help adopters adapt project-developed products or practices that are needed for local institutionalization.

This handbook will help Teacher Corps project personnel assess the effects of project-developed products, processes, and practices so that they will be able to provide adopters with plausible evidence of the effectiveness of the innovations.

QUALITY CONTROL AND EDUCATIONAL INNOVATION

Promising, Successful, or Exemplary?

The purpose of dissemination is to share information about successful educational programs. Problems arise, however, when we try to define what we mean by "successful." The evaluation of educational outcomes can range from an intuitive sense that "something happened" to very sophisticated measures of change that involve statistical analyses and rigorous research procedures. This handbook provides suggestions about quality control procedures that will enable Teacher Corps project personnel to assess the effects--the success--of educational products, practices, and other outputs prior to dissemination. Two assessment processes are outlined in the handbook:

- Review is the collegial on-going process for Teacher Corps project personnel to assess the effects and potential impact of innovations before dissemination among other Teacher Corps projects and other educational audiences (pages 11 to 33).
- Validation is the formal post-development process for Teacher Corps projects to assess the evidence of effectiveness for review by the Department of Education's Joint Dissemination Review Panel (JDRP) or state Identification, Validation, Dissemination (IVD) panels (pages 35 to 49).

Each process will require local or regional adaptation when it is implemented. The handbook suggests procedures and criteria which have general applicability for assessing educational innovations. In order to meet the particular requirements of each project, however, it will be necessary for Teacher Corps project personnel to develop specific procedures (forms, documentation requirements, etc.) to accomplish each of the processes.

In general, the processes have the following distinctions:

	Review	Validation
WHO?	Project personnel (others as appropriate)	Project personnel and evaluation consultant(s)
WHAT?	Innovations being developed or already implemented locally	Innovations found effective in project school or college sites
WHERE?	Local project LEA and IHE sites	At local project sites; then forwarded for review by Teacher Corps Program office or state IVD panel
WHEN?	Continuously	Whenever required
HOW?	As part of an ongoing evaluation; in preparation for disseminating to other Teacher Corps projects or other educational audiences	As the formal process of prescreening innovations before submitting to the JDRP or state IVP panels
WHY?	To collect evidence of the effectiveness of project-developed products and practices to share with potential adopters.	

NIE Product Review Criteria

The criteria suggested for use in the project review process have been adapted from those developed by the Dissemination and Resources Group of the National Institute of Education (NIE). These criteria, synthesized from the research literature on the evaluation, assessment, review, and selection processes for educational products and practices (EPIE Institute, 1978), are described in Appendix A, pages 51 to 58, and are incorporated in the checklist suggested for use in reviewing innovations developed by Teacher Corps projects (pages 16 to 33).

The JDRP and State IVD Processes

In the U.S. Department of Education the JDRP is charged with applying quality standards for products and practices--criteria relating to educational significance and credibility of supporting evidence--in the review of claims made for educational innovations. Excerpts from the JDRP Ideabook (Tallmadge, 1977) about JDRP criteria are included in the handbook section on validation. States variously make use of IVD panels or other review and certification procedures to identify effective products and practices.

The JDRP meets periodically in Washington to review submissions from Department of Education program offices (such as Teacher Corps Washington).

> . . .which are responsible for identifying potentially exemplary projects and for carrying out a pre-review screening for factual accuracy, social fairness, and possible harm to users, as well as for evidence of effectiveness. Only those submissions that are approved by the JDRP may be in any way endorsed by the Education Division or disseminated as exemplary using Federal Education Division funds. (Tallmadge, 1977)

The process outlined for project validation in this handbook will aid Teacher Corps projects make JDRP or state IVD submissions.

It is not anticipated that all Teacher Corps products and practices will undergo JDRP or IVD review. Many of the products and practices developed by Teacher Corps projects will be better suited to other dissemination systems. Products that include copyrighted material, for example, cannot be reproduced for further distribution without the permission of the copyright holder. We have outlined the process of project review in this handbook to enable Teacher Corps projects and networks to get promising products and practices, and/or information about them, into the many channels for dissemination that exist in addition to the JDRP/NDN system (see Guidelines for Dissemination of Teacher Corps Products and Practices).

Exemplary Products

The point to remember here is contained in the phrase "disseminated as exemplary using Federal . . . funds." A project can use its funds to disseminate products and practices to other LEAs and IHEs--and provide information about the effectiveness of the innovations at the local site--as long as project personnel do not state or imply that the products or practices are "exemplary" or are "endorsed" by the Department of Education. That indication of official approval is reserved to the JDRP.

Some of the important terms and concepts used in the handbook are defined on the following page. The next two sections of the handbook outline the procedures and criteria for reviewing and validating Teacher Corps products and practices. The processes are distinct in terms of the persons who serve in particular roles and in the emphasis on assessing practical outcomes and empirical evaluation data.

Educators who use this handbook need to be aware of the definitions of several terms from the field of dissemination as they are used herein. The JDRP Ideabook provides the following definitions:

Educational Innovation	A broad concept which includes products, processes, practices, programs, and other outcomes.
Educational Products	"Products" and "materials" refer to transportable, tangible or packaged programs or practices such as curriculum materials, educational management systems, computer programs, staff training material, guides, models, administrative procedures and Project Information Packages (PIPs).
Educational Practices	"Practices" and "methods" refer to systematic programs, procedures, or techniques whose adoption or adaptation requires assistance from the originators or their representatives.

This handbook also makes use of the more precise perspective on educational materials defined by Emrick and Peterson (1978):

> Materials: brochures, manuals, workbooks, handbooks, filmstrips, videotapes, and other hard-copy or mediated presentations of information. Three different types of materials are used in dissemination/utilization efforts:
>
> > Descriptive materials: printed matter, visual displays, and other hard-copy information designed to communicate what the new knowledge, product, or practice is, how it can be used, and what benefits will accrue from use.
> >
> > Instructional materials: the textbooks, workbooks, audiovisual sequences, and other items which make up the basic curriculum or content of the educational process (curriculum materials that are not central to the innovation are classified as support materials).
> >
> > Support materials: printed matter, audiovisual aids, and other informational components that occupy a background or optional status; support materials include elements of an innovation's curriculum, management, and implementation that are neither central to the innovation nor essential to its utilization.

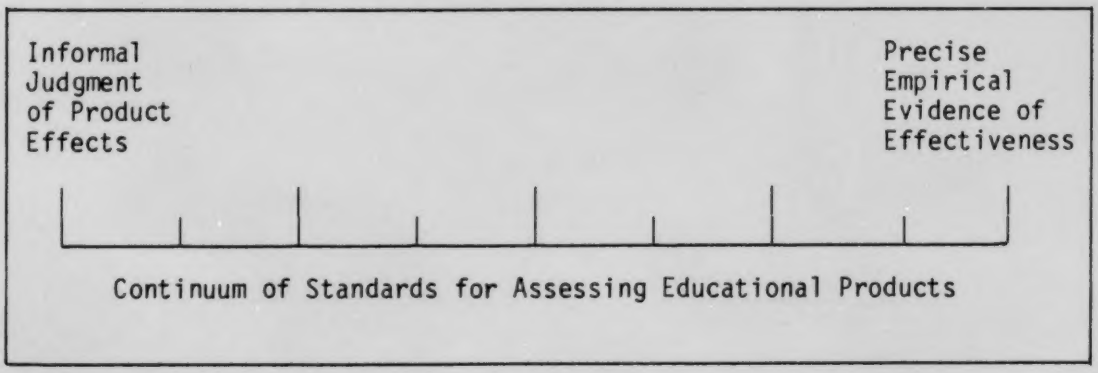
GUIDELINES FOR PROJECT REVIEW

OF INNOVATIVE PRODUCTS AND PRACTICES

Local Quality Control

The guidelines that follow provide suggestions for procedures and criteria for reviewing Teacher Corps products and practices. The process that is outlined here is very general; each project will have to determine the specific documentation requirements and the nature of the evaluation processes for assessing the quality of products and practices that are selected for outreach. The criteria for reviewing educational products may be applied (1) according to rigorous standards of empirical precision, (2) according to informal judgmental estimates of product effects, or (3) anywhere along a continuum between the two. Decisions about the rigor of standards for reviewing educational innovations will have to be made in light of the situation existing in the local project site:

- What resources for assisting in program evaluation are available to the project?
- How valid and reliable are the existing product or practice evaluation data?
- What kinds of evaluation data are considered important by potential adopters?
- How much evidence of effectiveness is necessary to persuade potential adopters to pay attention to the innovation?
- What are the opportunity costs of investing in the kind of evaluation that will yield credible evidence about product effects?


Informal Judgment of Product Effects
Precise Empirical Evidence of Effectiveness
Continuum of Standards for Assessing Educational Products

The standards employed in reviewing an innovation may be aimed toward establishing claims of product effectiveness that could be submitted to the JDRP. This, as noted already, is the objective of the validation process and is described in detail in the next section. The emphasis on empirical evidence of change that is typically accepted by the JDRP need not, however, be viewed as a limiting factor in decisions related to evaluation design.

The outcome of careful, systematic product review--using this set of criteria and rating forms--may be evidence of product effectiveness that meets the standards for JDRP approval, but it need not be. The credibility of the evaluation of a Teacher Corps product or practice can be established without large amounts of empirical data. The effectiveness of some educational practices and processes cannot be established by conventional experimental procedures, data collection, or statistical analyses.

One approach to organizing project personnel for the review of project-developed products or practices is outlined below.

Project Review

A. The Roles

The Applicant - The individual (or individuals) of a project who prepare the documentation for the review process for consideration by the Project Review Committee.

The Project Review Committee - A group of three to five persons (including the project director and representing the LEA and IHE project staff and the Community Council) who review products and practices prior to dissemination to other Teacher Corps projects and/or other educational audiences.

B. The Process

A Local Teacher Corps project will establish a Project Review Committee to assess:

- The potential of products or practices (either under development or after implementation locally) for institutionalization and for use by other Teacher Corps projects, and/or
- The suitability of products or practices for dissemination to educational agencies outside Teacher Corps.

Review Committees use the product rating form in this handbook or other suitable criteria to assess the potential of products or practices as:

- Promising innovations (under development or already implemented) for dissemination through the variety of information exchange mechanisms that operate within Teacher Corps and beyond to other educational audiences.

- Innovations considered suitable for external adoption or adaptation; information may be submitted as part of the validation process, described in the following section (pages 35 to 49).

C. Guidelines

The applicant will be allowed to withdraw a product or practice from the review process at any point during the procedure.

The applicant will be responsible for preparing all descriptive material about the product or practice to be reviewed and will comply with the application procedures and criteria for submission to the dissemination system selected.

D. Resources for Review and Validation

Pages 16 to 33 of the handbook provide a rating instrument* that Teacher Corps project personnel may duplicate and adapt for use in reviewing educational products or practices. The appendices of the handbook contain other materials that may assist in the review process; these include:

Topic	Handbook Section	Pages
Assessment criteria	Appendix A. Operational Definitions of NIE Criteria	51-58
ERIC Criteria	Appendix B. Criteria for Submission of Educational Materials to ERIC	59-64

*Adapted from the NIE Product Rating Form (Susan Klein, 1974)

The following materials may also be helpful in conducting project reviews and, as well, project validations:

ED Materials/Support Center, National Diffusion Network. Far West Laboratory for Educational Research and Development, San Francisco, CA:

*Guide to Packaging Your Educational Program, 1980.

*Guide to Producing Print Materials, 1979.

Educational Resources Information Center (ERIC), National Institute of Education, U.S. Department of Education, Washington, DC, 1979:

*How to Use ERIC.

*Submitting Documents to ERIC.

Emrick, John A., with Peterson, Susan M. A Synthesis of Findings Across Five Recent Studies in Educational Dissemination and Change (Revised Version). Far West Laboratory for Educational Research and Development, San Francisco, CA, June 1978.

EPIE Institute. Criteria for Reviewing Educational Products. Product I, NIE Products on Instructional Materials Selection (DHEW). ERIC Clearinghouse on Information Resources, Syracuse University, Syracuse, NY, 1978.

Teacher Corps Dissemination Project, Far West Laboratory for Educational Research and Development, San Francisco, CA, 1980:

Guidelines for Dissemination of Teacher Corps Products and Practices.

*Manual for the Development of Educational Materials.

Teacher Corps Dissemination Checklist.

Teacher Corps Dissemination Sources.

Teacher Corps Dissemination Tool Kit (includes publications listed here that are marked with an asterisk [*]).

Technical Assistance Base of the National Diffusion Network. Capla Associates, Inc., Rochelle Park, NJ:

*Developer/Demonstrator Task Analysis.

*Getting It All Together: The JDRP Process.

E. Product Rating Form

This form was designed to facilitate the review of the quality of educational products for decisions related to continued product development, additional product evaluation, product dissemination or product utilization. The form is not designed to review technical plans for carrying out any of the above activities. This form has been developed to indicate dimensions of apparent quality of products even when highly credible evidence is not available to confirm these ratings.

DIRECTIONS

Sources of Information

In determining your ratings, please consider all available evidence including the product itself (as well as samples of the product in use), qualitative or quantitative evidence provided by the producers (developers or publishers), judgmental or empirical information from other sources and information derived from your experiences and knowledge of the field. Feel free to contact developers, users, or others to secure additional information or to verify or clarify existing information.

Ratings on Major Criteria

After reviewing the relevant evidence on the prime and comparative products and determining the credibility of this evidence, circle the number 0 to 4 which reflects your best judgment of the value of the product on the relevant criteria dimensions. As indicated by the Product Review Form, the major criteria include: Desirability, Intrinsic Quality, Cost/Adoptability, and Effectiveness. These criteria dimensions are further subdivided to obtain more precise ratings . . . . On the ratings of each type of evidence, please star (*) the considerations which primarily contributed to your judgments. Also, wherever possible, try to keep your ratings on the different criteria dimensions distinct so that the dimensions will assess unique factors. For example, the rating on the "desirability" of the product should not be altered by its rating on "cost" or "effectiveness."

Overall ratings for each major criteria dimension and for the total product quality should reflect the average of the sub-ratings unless there is a defensible rationale for rating otherwise--such as a plan to weight the contributing criteria differently.

CRITERIA WEIGHTING FOR THE PRODUCT RATING FORM

Teacher Corps Review Commitees may use the Product Rating Form to assess the merit of completed products. PLEASE ASSIGN PERCENTAGE VALUE POINTS TO EACH OF THE CRITERIA. Sum these criteria for each major grouping such as Desirability, Intrinsic Quality, Cost and Adoptability, Effectiveness and Other. (Please use whole numbers 1-100.) Assume that the evidence to rate the criteria is available and credible.

☐ A. Desirability

____ 1. Need

____ 2. Marketability and Demand

☐ B. Intrinsic Quality

____ 1. Social Fairness

____ a. sex

____ b. race

____ c. religion

____ d. socio-economic

____ 2. Content Accuracy

____ 3. Technical Quality of Communication

____ 4. Instructional Quality

____ 5. Product Appeal

____ 6. Uniqueness

____ 7. Adequacy of Product Development

☐ C. Costs and Adoptability

____ 1. Costs

____ a. Reasonableness

____ b. Compared to Common Alternatives

____ c. Compared to Critical Competitors

____ 2. Adoptability

____ a. Acceptability

____ b. Exportability

____ c. Flexibility

____ d. Ease of Use, Manageability

☐ D. Effectiveness

____ 1. Type and Comprehensiveness

____ 2. Potency (size, significance, duration)

____ 3. Extent of Initial Target and Non-Target Groups Effected

____ 4. Cumulative Nature of Effects on Non-Initial Users

____ a. Snowball effect

____ b. Impact effects

____ 5. Interactive Effects

____ 6. Efficiency

☐ E. Other Important Criteria (please specify)

100% Total Points Possible

When used with developing Teacher Corps products or practices reviewers are encouraged to revise their ratings as new or more credible evidence emerges during the development and evaluation phases.

Bear in mind, however, that the instrument was designed for use by reviewers other than the developers and that the "closeness" of project personnel to an innovation will affect their objectivity.

Credibility of the Information

The ratings on the criteria dimensions should be influenced by the credibility of the evidence reviewed. If some of the sources of evidence or types of information have low credibility (0-1 ratings), do not base your judgments on this low credibility evidence. At the minimum, it is hoped that you will attribute at least passable credibility to your own analysis and judgments and thus be able to rate all the relevant dimensions requested in this Product Rating Form even if credible information from other empirical or judgmental sources is lacking.

To help in later group discussions of the ratings and in feedback to the producers, please indicate by a check (✓ or ✓✓) which source of evidence most influenced your judgment. Then rate the credibility of all sources on a scale from 4 (high) to 0 (low).

Scale values associated with credibility or believability of the evidence include:

4 -- Excellent Credibility -- Complete confidence in the evidence because: the quality and appropriateness of evaluative measures and evaluation procedures are impeccable; the information is objective and generalizable on many relevant dimensions; and the effects referenced are supported by adequate evidence of causality. (These considerations are described in more detail in the chart on Credibility Dimensions Associated with Each Level of Evidence Presented.)

3 -- Good Credibility -- Moderate confidence in the evidence because: the measures and evaluation procedures are appropriate and of sufficiently high quality; there is no reason to question the objectivity of the information, there is some indication of causality where an effect is claimed; and information on generalizability is limited.

2 -- Passable Credibility -- Minimum confidence in the evidence because: although there may be better approaches, the measures and evaluation procedures are acceptable; while the data may be subjective, there is no conflicting information to question its validity; generalizability is limited; and evidence related to causality is weak.

1 -- Doubtful Credibility -- Partial confidence in major portions of the evidence because: the measures and evaluation procedures are not completely acceptable; the information is more subjective than objective; the generalizability is severely limited; and there is little or no evidence of causality.

0 -- Negligible or No Credibility -- No confidence in major portions of the evidence because: the measures and evidence procedures are unacceptable; the information is subjective; the generalizability is severely limited; and there is no adequate evidence of causality.

A. DESIRABILITY: NEED AND MARKETABILITY

1. Need

Assuming that this product is as ideal as it is described to be, use the following considerations in rating the need for the product in its given domain:

° Social and educational significance of the problem (existing state in education and desired end state)

--Size of population directly and indirectly affected by the problem

--Intensity of the problem (demand for a solution)

--Priority of the problem (importance to the decision maker-funding source)

° Relevance of product to general problem: Extent to which the product including side effect dimensions responds positively to the problem

--Scope and centrality of the product to the need

--Appropriateness or timeliness of the product for the need. Is there a need or a desirable want that is not already served?

--Size of population which is likely to be served by the product or appropriate and options including potential multiplicative or impact effects on secondary targets or beneficiaries.

Negligible need — Extremely important need

0 ——— 1 ——— 2 ——— 3 ——— 4

Indicate High (4) to Low (0) on credibility of the information on which you based your judgment:

___ rationale of need provided by producer, ___ other judgmental information, ___ empirical information provided by producer, ___ other empirical information.

2. Marketability and Demand

Assuming that this product is as ideal as it is described to be, use the following considerations to rate the potential marketability or demand for the product:

- Availability of other products to meet the need
- Likelihood that product would be used if available (market study--for mass or thin market, publisher commitments)

Probable Negligible Demand for the Product — Likely Strong Demand for Product

0 _____ 1 _____ 2 _____ 3 _____ 4

Indicate High (4) to Low (0) on the credibility of the information on which you based your judgment:

___ information provided by producers, ___ other judgmental information, ___ other empirical information.

Overall Rating on the Desirability of this Product Assuming that it is as Ideal as it is Described to be. (consider above two (2) ratings)

Negligible desirability — Extremely desirable

0 _____ 1 _____ 2 _____ 3 _____ 4

Please discuss your reasons, frame of reference, weighting for different types of evidence, etc.

B. INTRINSIC QUALITIES (Items dealing with the essential nature or constitution of the product)

1. Social Fairness - extent to which the product excludes and counters bias related to sex, race, religious beliefs, ethnicity and socio-economic status

a.

Contains obvious bias related to sex — Affirmative Action appears to counter bias related to sex by appropriate corrective measures

0 _____ 1 _____ 2 _____ 3 _____ 4

b.

Contains obvious bias related to race and ethnicity — Affirmative Action appears to counter bias related to race and ethnicity by appropriate corrective measures

0 ——— 1 ——— 2 ——— 3 ——— 4

c.

Contains obvious bias related to religious beliefs — Affirmative Action appears to counter bias related to religious beliefs by appropriate corrective measures

0 ——— 1 ——— 2 ——— 3 ——— 4

d.

Contains obvious bias related to socio-economic status — Affirmative Action appears to counter bias related to socio-economic status by appropriate corrective measures

0 ——— 1 ——— 2 ——— 3 ——— 4

Indicate High (4) to Low (0) on the credibility of the information or analysis on which the social fairness judgments are based.

___ producer information, ___ others' analysis of the product,
___ your analysis of the product

2. Content Accuracy and Validity - extent to which this product is accurate and appropriately complete; for learner level and up-to-date with current knowledge

Contains serious flaws or inadequacies — Content is accurate and appropriately complete for learner level

0 ——— 1 ——— 2 ——— 3 ——— 4

Indicate High (4) to Low (0) on the credibility of the information or analyses on which these content accuracy and validity judgments are based:

___ producer information, ___ others' analysis of the product,
___ your analysis of the product

3. Technical Quality of Communication - extent to which audio and/or visual materials are presented, edited, synthesized, etc. to communicate clearly and appropriately

Hampers communication of content — Greatly facilitates communication of content

0 ——— 1 ——— 2 ——— 3 ——— 4

Indicate High (4) to Low (0) on the credibility of the information or analyses on which this technical quality is assessed:

___ producer information, ___ others' analyses of the product,
___ your analysis of the product

4. Instructional Quality - extent to which instructional strategies are appropriate for target groups

Consider:

- wise use of learning strategies, motivational techniques
- correct reading level
- inclusion of evaluation components as appropriate
- appropriate sequencing and pacing

Apparent serious flaws — Highly appropriate strategies known to work with similar users

0 ——— 1 ——— 2 ——— 3 ——— 4

Indicate High (4) to Low (0) on the credibility of the information or analysis on which this instructional quality is based:

___ producer information, ___ others' analysis of the product,
___ your analysis of the product

5. Product Appeal - extent to which product might appear artistic, creative, pleasing or satisfying to potential purchasers or users

Product might appear unappealing, blah, preachy or condescending, disagreeable or unsatisfactory to majority of target users — Product would appear to have great appeal and satisfaction for potential target users

0 ——— 1 ——— 2 ——— 3 ——— 4

Indicate High (4) to Low (0) on the credibility of the information or analysis on which this assessment of product appeal is based:

___ producer judgmental and empirical information, ___ other judgments of the product, ___ other empirical assessments of the product, ___ your judgment of the product.

6. Uniqueness or Innovativeness of Product in terms of: combinations of intrinsic quality and other dimensions and methodological advances (models, etc., for improving education in other substantive areas).

Commonplace, no different from normal practice — Highly unique model for a new type of product

0 ——— 1 ——— 2 ——— 3 ——— 4

Indicate High (4) to Low (0) on the credibility of the information or analysis on which this assessment of product uniqueness is based:

___ producer judgment and/or empirical evidence, ___ other judgments of the product, ___ other empirical assessments of the product, ___ your judgment of the product.

7. Adequacy of the Product Development Process - extent to which the product is "well made." Consider the use of early task analysis, clear statements of purpose and objectives, appropriate relationships between tasks, appropriate formative evaluation and revision

No information to suggest that the product was "well made" — Product seems to have been carefully developed

0 ——— 1 ——— 2 ——— 3 ——— 4

Indicate High (4) to Low (0) on the credibility of the information on which this assessment of the adequacy of the product development process is based.

___ producer supplied background information, ___ other background information, ___ your or others' assessment of the product itself.

Overall Rating on Intrinsic Quality

Low Intrinsic Quality — High Intrinsic Quality

0 ——— 1 ——— 2 ——— 3 ——— 4

Please discuss your reasons, weightings for different dimensions, etc.

C. COSTS AND ADOPTABILITY

1. Costs

Consider:

- materials, equipment, etc., provided for learners (distinguish between optional and required)
- materials, equipment, etc., provided for teachers and other personnel (e.g., orientation and pre- and inservice training materials and procedures, including description of the responsibilities of different individuals who contribute to the product's use). (Distinguish between optional and required.)
- personnel costs required for product adoption (number and types of personnel required, level of special training required, availability of special training, costs of training and/or consultants, and other necessary support services.
- total product installation and continuation costs per user, school, or equivalent unit.
- cost per individual student or target recipient in terms of dollars and average hours of use required.

a. Reasonableness of costs in dollars or dollar equivalent (see above considerations) for initial installation and continued use in terms of anticipated outcomes and economic reach of potential purchasers or users.

Excessively high costs for potential purchasers — Low costs for potential purchasers

0 ——— 1 ——— 2 ——— 3 ——— 4

b. Comparative rating of costs in relation to the costs for common alternatives.*

Excessively high costs compared to common alternatives — Low costs compared to common alternatives

0 ——— 1 ——— 2 ——— 3 ——— 4

*Common alternatives are usual practices such as teacher lectures which are designed to achieve similar purposes. Critical competitors are exportable products designed to achieve similar purposes.

c. Comparative rating of costs in relation to critically competitive* products, if any exist.

Excessively high costs compared to costs for critical competitors				Low costs compared to critical competitors
0	1	2	3	4

Indicate High (4) to Low (0) on the credibility of the information on which you based your judgments:

___ cost information provided by the producer, ___ externally supplied or verified cost data, ___ external cost estimates.

2. Adoptability

a. Acceptability to purchasers and users

Consider:

- lack of opposition by target users or beneficiaries, by purchasers or others involved with the product
- legality of use, conforming to appropriate copyright provisions, state laws, etc.

Extensive user or purchaser opposition to product				Highly acceptable to users or purchasers
0	1	2	3	4

Indicate High (4) to Low (0) on the credibility of the information on which you based your judgments:

___ information provided by the producer, ___ other judgmental information, ___ other empirical information

*Common alternatives are usual practices such as teacher lectures which are designed to achieve similar purposes. Critical competitors are exportable products designed to achieve similar purposes.

b. Exportability

Consider:

- is the product sufficiently complete to be used outside of the developmental sites? (i.e., on a "stand alone" basis without developers present)
- are the product and its supporting materials amenable to adequate dissemination?
- if auxiliary services such as teacher training, equipment maintenance, or external testing services are needed, to what extent are they likely to be available in user sites?

Very difficult to use outside the development setting — Easy to use outside the development setting

0———1———2———3———4

Indicate High (4) to Low (0) on the credibility of the information on which you based your judgments:

___ information provided by producer, ___ other judgmental information, ___ other empirical information.

c. Flexibility - to what extent can the product be easily changed or adapted to local needs or used to fit multiple needs and constraints?

Product Adaption not recommended or quite difficult — Product Adaption recommended and quite easy

0———1———2———3———4

Indicate High (4) to Low (0) on the credibility of the information on which you based your judgments:

___ information provided by the producer, ___ other judgmental ___ information, ___ other empirical information.

d. Ease of Use: Manageability

Consider:

- consumer readiness: degree to which product can be used under pre-existing user constraints
- extent of resource requirements (equipment, personnel, space) not normally available in schools

- extent of organizational changes needed in scheduling, organizing personnel, revising management systems, etc., to fit with existing components of the educational system

- ease of consumer maintenance, product durability (or ease of updating products), usefulness of auxiliary materials (teacher guides, evaluation procedures) quality control mechanisms

Not easily managed with common existing resources — Easy to operate, use with common existing resources

0 ——— 1 ——— 2 ——— 3 ——— 4

Indicate High (4) to Low (0) on the credibility of the information on which you based your judgments:

___ information provided by the producer, ___ other judgmental information, ___ other empirical information.

Overall Rating on Cost and Adoptability

High cost, difficult to adopt or adapt — Low cost, easy to adopt or adapt

0 ——— 1 ——— 2 ——— 3 ——— 4

D. EXTRINSIC EFFECTS--EFFECTIVENESS

1. Type and Comprehensiveness of Learner Effects on Appropriate Target Population

Consider number of positively affected key variables which are related to:

- learner knowledge, attitude, or awareness changes (as indicated by paper and pencil assessments or the equivalent)

- learner performance or skill changes (behavioral indicators such as application tests, simulations, or "real life" observations over short and long term periods).

Few trivial types of positive learner effects — Many important types of positive learner effects

0 ——— 1 ——— 2 ——— 3 ——— 4

Indicate High (4) to Low (0) on the credibility of the information on which you based your judgment:

___ empirical evidence provided by the producer, ___ judgmental evidence provided by others (own), ___ straight empirical evidence provided by others, ___ comparative empirical evidence.

(Evidence supporting the credibility issue of causality would have to be examined carefully. Performance changes would probably be weighted more highly than cognitive changes.)

2. Potency of the Effects

Consider:

- size and significance of the change resulting from the product on the prime target group
- duration of the effect

(The credibility of measures and evaluation procedures would have to be examined carefully).

Small, insignificant short-term effects — Extensive, significant long-term effects

0 ——— 1 ——— 2 ——— 3 ——— 4

Indicate High (4) to Low (0) on the credibility of the information on which you based your judgment:

___ empirical evidence provided by the producer, ___ judgmental evidence provided by others, ___ straignt empirical evidence provided by others, ___ comparative empirical evidence.

(Evidence supporting the credibility issue of causality would have to be examined carefully. Performance changes would probably be weighted more highly than cognitive changes.)

3. Extent of Initial Target and Non-Target Groups Affected Positively

Consider:

- extent of positive effects (minus negative effects) on the target group (intended recipients to solve educational problem)
- extent of positive effects minus negative effects on the non-target group (unintended recipients)

Positive effects on a limited segment of the target group and on few non-target group members — Positive effects on total target group and many non-target group users

0 ——— 1 ——— 2 ——— 3 ——— 4

Indicate High (4) to Low (0) on the credibility of the information on which you based your judgment:

___ empirical evidence provided by the producer, ___ judgmental evidence provided by others, ___ straight empirical evidence provided by others, ___ comparative empirical evidence.

(The credibility issue related to the extent of generalizability to target and non-target populations should be examined carefully. Positive effects on target groups would probably be weighted higher than positive effects on non-target groups.)

4. Cumulative Nature of the Effects on Others (not the original users)

Consider:

a. Multiplicative or "snowball" effects (e.g., original users will be able to train other users to do the same thing)

Negligible "snowball" effects — Extensive "snowball" effects

0 ——— 1 ——— 2 ——— 3 ——— 4

b. Impact effects (e.g., original users such as teachers will learn to behave in ways that have positive results on their students)

Negligible positive impact effects on individuals who are original users — Extensive positive impact effects on individuals who are original users

0 ——— 1 ——— 2 ——— 3 ——— 4

Indicate High (4) to Low (0) on the credibility of the information on which you based your judgment:

___ empirical evidence provided by the producer, ___ judgmental evidence provided by others, ___ straight empirical evidence provided by others, ___ comparative empirical evidence.

(Evidence supporting the credibility issue of causality would have to be examined carefully. Performance changes would probably be weighted more highly than cognitive changes.)

5. Interactive Effects of the Product (treatment) with other products (treatments) under conditions, or user characteristics. Do the effects on the original users become stronger or weaker when used with other treatments or after specified pre-requisite treatments? Many interactive effects may be labeled as positive or negative "side effects."

Negative interactive effects of the product and other products or user conditions or characteristics

0 ——— 1 ——— 2 ——— 3 ——— 4

Positive interactive effects of the product and other products or user conditions or characteristics

Indicate High (4) to Low (0) on the credibility of the information on which you based your judgment:

___ empirical evidence provided by the producer, ___ judgmental evidence provided by others, ___ straight empirical evidence provided by others, ___ comparative empirical evidence

(Credibility issues related to generalizability and external validity should be examined carefully.)

6. Efficiency in Achieving the Effects

Consider:

- amount of learner time required to attain effects
- amount of other (non-dollar) resources required to attain effects (e.g., numbers of instructional personnel required)

Negligible efficiency in achieving effects

0 ——— 1 ——— 2 ——— 3 ——— 4

Extensive efficiency in achieving effects

Indicate High (4) to Low (0) on the credibility of the information on which you based your judgment:

___empirical evidence provided by the producer, ___ judgmental evidence provided by others, ___ straight empirical evidence by others, ___ comparative empirical evidence.

(Evidence supporting the credibility issue of causality would have to be examined carefully. Performance changes would probably be weighted more highly than cognitive changes.)

Overall Rating on Effectiveness of Product

Negligible positive effects — Extensive positive effects

0 ——— 1 ——— 2 ——— 3 ——— 4

Please discuss your reasons, weightings for different dimensions, etc.

OVERALL RATING ON TOTAL PRODUCT QUALITY

Inferior quality — Excellent quality

0 ——— 1 ——— 2 ——— 3 ——— 4

Differential weightings of the major types of evidence should be explained.

GUIDELINES FOR PROJECT VALIDATION

OF INNOVATIVE PRODUCTS AND PRACTICES

External Quality Standards

The following guidelines suggest procedures for Teacher Corps project validation of educational products and practices for submission to the Joint Dissemination Review Panel (JDRP). Similar procedures are prescribed for many state IVD processes. Each project will decide on the specific processes for validation, including administrative procedures, allocation of project funds, documentation requirements, and criteria in addition to those of the JDRP or the state IVD review.

Though projects may decide on more or less rigorous requirements for preliminary screening of innovations, the investigation of claims of effectiveness will focus on the submission materials required for review by the JDRP (as outlined on pages 41 to 48 of this handbook).

Project Validation

A. The Roles

The Applicant - The director of the Teacher Corps project applying for validation of a project-developed innovation.

Investigator or Investigation Team - Two options are available:

- The Advocate or Advocate Team - A Teacher Corps project director (possibly teamed with one other resource person selected by the applicant) who may be designated to conduct the investigation of the product or practice.
- The Validation Agent - An expert (not associated with Teacher Corps) who may conduct the investigation of the claims of effectiveness for the innovation.

Validation Committee - A committee of three to five members, representing project directors, deans, and the LEAs and IHEs of other projects in the state or region.* The committee will be responsible for reviewing the recommendations to the Teacher Corps program office. It may also provide subcommittees to investigate project innovations.

*Obviously, this may not be feasible for projects located in some areas of the country. A committee of experienced educators could be formed with members from other components of the IHE and LEA.

The Teacher Corps Washington Dissemination Unit - The person designated by the program office to submit the transmittal memorandum and each submission that has completed the Teacher Corps project validation process to the Joint Dissemination Review Panel.

B. The Process

Advance Information Sharing - Local projects will prepare a brief prospectus for each product or practice they believe has potential for validation. These may be shared with nearby Teacher Corps projects in advance of the preparation of formal validation documents. A prospectus on an innovation may draw upon data accumulated during the local project review. Participants in each of these sharing situations can identify products and processes that appear to have sufficient evidence of effectiveness to warrant an application for validation. Each developer will be free to prepare formal application materials for JDRP review of the innovation.

Initiation - The applicant will prepare a draft version of the Form for Submitting Materials to the Joint Dissemination Review Panel for review by the Validation Committee. The applicant will distribute copies to each member of the committee and, after a reasonable period (10-15 days), will poll the committee to determine if there is sufficient consensus among the members to continue the validation process.

Validation Committee Action - The members of the committee will: (a) consider the application and recommend that it receive continuing validation action or (b) recommend that the application be rejected. If a majority of the committee rejects the initial request or causes the process to stop at any point short of successful completion, the committee chairperson will send a letter to the applicant giving reasons for such action. The applicant may respond in writing to each member of the committee within two weeks. The committee members will then reconsider their decisions and the chairperson will notify the applicant in writing of the committee's decision. If the committee accepts the request, the applicant will be advised to schedule an investigation.

Procedural Options for Investigation - Teacher Corps projects may choose from the following alternatives in establishing the formal process for investigating the claims of effectiveness for project-developed innovations:

- Advocate (or Advocate Team) investigation by a Teacher Corps project director or other qualified person selected by the Validation Committee.
- Validation Agent investigation by a specialist in educational evaluation selected by the Validation Committee.

- Validation Committee investigation by a subcommittee selected from the Validation Committee.
- Combinations of the three preceding options may also be selected to expedite the validation process.

The Investigation - Whichever of the three processes (or combinations of processes) for assessing project innovations is selected, a site visit provides an excellent oppportunity to determine objectively the accuracy of the claims of effectiveness made by the applicant. During a two-day visit the investigator (or investigation team) may include one day of pertinent interviews, review of evaluation data, and any other activity which might serve to familiarize the team with the innovation. The second day of the visit would allow for completion of data gathering, analysis, preparation of a report, and opportunity to discuss the investigator's recommendations to the committee with the applicant. A letter report of the investigation should be sent to members of the Validation Committee within two weeks of the visit with one of the following recommendations:

- The Validation Committee should take no further action on the validation of the innovation; the investigator does not support validation of the innovation.
- The Validation Committee should take no further action until such time that the applicant brings evidence to the committee that specified developmental activities (for example, an additional field test) have been carried out in regard to the product or practice. At such a time, the investigator would support validation of the innovation.
- The Validation Committee should support validation of the innovation.

In the event that the applicant and the investigator cannot reach mutual agreement on recommendations to the committee, the applicant may file an appeal to the committee within two weeks of the original investigation requesting a second investigation.

Validation Committee Action - The investigator will send copies of the report to each member of the Validation Committee and to the applicant, and schedule a meeting (or conference call if that is more practical) of the committee. The committee will hear any final arguments for or against validation from the applicant and/or the investigator. The Validation Committee will make its recommendations on validation using normal decision making rules. In cases of approval, the Validation Committee will direct the applicant to submit the validation documents to the Teacher Corps Washington Dissemination Unit for program review prior to submission to the JDRP.

C. Guidelines

The applicant will be allowed to withdraw an innovation from consideration at any point in the validation process.

The applicant will be responsible for preparing all descriptive material in regard to the innovative product or practice.

The selection of an advocate or advocate team by the Validation Committee may take into account the following factors:

- Preferences of the applicant, especially for a resource person to serve with a project director.
- Equitable distribution of the advocacy workload among the other project directors.
- The individual director's desire to serve as advocate for a given validation effort.
- Background or experience in the technical areas which are related to the innovation to be validated.

If no director is willing to serve as an advocate for a given validation request, the Validation Committee will select an impartial investigation group from its own members or other available sources.

The selection of the Validation Agent by the Validation Committee may involve consideration of the following factors:

- Qualifications in the technical areas related to the innovation to be validated. Acceptable evidence might be publications, research, reports, and/or recommendations of persons in responsible educational positions.
- Availability in terms of scheduling and fees that are not beyond project budget limitations.
- Whether or not the agent has had any involvement in the development of the innovation to be validated.
- Whether or not the agent is an employee of the institution of higher education or local educational agency which sponsors the applicant's Teacher Corps project.

The selection of the Validation Committee may be done as follows:

- Project directors will share with nearby projects the name(s) and background(s) of project directors, deans, and other project staff personnel of the SEAs and LEAs with expertise and interest in serving on validation committees.

- Applicants will consult the roster of candidates (and accompanying background data) and invite individuals to serve on a Validation Committee to review particular products or practices.

The validation documents submitted to the Teacher Corps Washington Dissemination Unit will include the completed form for submitting materials to JDRP, and may include the Investigation Report and other documentation of the Validation Committee.

D. Resources for Validation

The appendices contain information that may be useful in conducting a project validation:

Topic	Handbook Section	Pages
Criteria	Appendix A. Operational Definitions of NIE Criteria	51-58
Format	Appendix C. Specimen JDRP Submission	65-75

The JDRP and IVP process are described in detail in the following:

Tallmadge, G. Kasten. The Joint Dissemination Review Panel Ideabook. U. S. Department of Health, Education and Welfare: Office of Education and the National Institute of Education, October 1977. Available from ERIC, ED 148 329, or from the Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20202, Stock #017-080-01824-1; $3.00 prepaid).

Hinze, William. Sharing Educational Success: A Handbook for Validation of Educational Practices. (Revised Edition, GPO 861 549). (Copies may be requested from Dr. William H. Hinze, National Diffusion Network, Room 631, Transpoint Building, Washington, DC 20202).

The documentation of a Teacher Corps project's experience with the JDRP is in:

Nagel, Thomas. A Teacher Corps Case Study: The National Validation of SIGMA. Teacher Corps Developmental Training Activities, University Nebraska at Omaha, 1980.

See also the list of publications on page 15 (above) for additional materials.

E. JDRP Format

FORMAT AND INSTRUCTIONS FOR SUBMITTING MATERIALS*
TO THE JOINT DISSEMINATION REVIEW PANEL

The outline on the following pages displays the format that should be used for submitting materials to the Joint Dissemination Review Panel. Under each major heading are specifications for the kinds of information that should be included.

In order to be convincing, the evaluation need not be a strict experimental design, although this type of evidence is desirable. However, there should be some kind of high-quality, objective, methodologically sound, quantitative evidence demonstrating that the intervention in question was effective and superior to other, more commonly used methods or approaches, and that the observed effects were caused by the intervention.

The total length of each submission, including all descriptive material, tables, etc., should not exceed ten pages. Ten pages is a maximum; less lengthy presentations are definitely acceptable and encouraged. The evidence needs to be convincing, not necessarily lengthy. Some of the strongest arguments are brief, concise, and to the point.

While brevity is a virtue, the materials should include all the information the panel will need to make its decision. All submissions should follow the format by using the headings shown, and should cover all the points mentioned in the instructions under each heading. The points under each heading should be presented in the order most convenient and logical for the intervention being documented, not necessarily in the same order as in these instructions.

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* Ideabook, Tallmadge, 1977.

FORMAT FOR SUBMITTING MATERIALS
TO THE JOINT DISSEMINATION REVIEW PANEL

PROGRAM AREA: (e.g., Title III, reading, career education, environmental education, education for the handicapped)

I. INTERVENTION TITLE, LOCATION:

Specify the title of the intervention and the location for which evidence of effectiveness is being submitted.

II. DEVELOPED BY:

Indicate who developed the intervention originally, even if this happened at a different site than the one for which evidence of effectiveness is being presented.

III. SOURCE AND LEVEL OF FUNDING:

List all funding sources for the intervention at the location for which evidence of effectiveness is presented and, for each source, list the amount of funds (see Figure 1 for an example).

IV. YEARS OF INTERVENTION DEVELOPMENT:

Indicate the year or years during which the intervention was originally developed or tested.

V. BRIEF DESCRIPTION OF INTERVENTION:

Briefly describe the intervention for which claims of effectiveness are being made. The description should cover at least the following points:

What is the intervention?
What are its objectives?
What claims of effectiveness are being made?
What is the context in which it operates?
Who are the intended users and beneficiaries?
What are the characteristics of the groups on which the intervention was developed and tested?
What are the salient features of the intervention?
What are the costs for adoption and maintenance of the intervention?

VI. EVIDENCE OF EFFECTIVENESS:

Describe the evidence of effectiveness for the intervention. This section should deal with each of the following points, although not necessarily in the same order:

Interpretability of measures: Evidence that the quantitative measures are reliable and valid indicators of the effects claimed.

Credibility of evidence: Who collected and analyzed the data, what assurances are there that the findings are objective?

Evidence of impact: What is the evidence that something happened? What are the effects claimed for the intervention?

Evidence of statistical reliability of the effects: What is the evidence that the effects happened often enough and with sufficient reliability to be likely to happen again under similar circumstances?

Evidence that the effects are educationally meaningful: What is the evidence that the effects are large enough, powerful enough, or important enough to be educationally meaningful, regardless of their statistical significance?

Evidence that the effects are attributable to the intervention: Can alternative explanations such as practice effects, maturation, selection of superior treatment groups, etc., be ruled out?

Evidence of generalizability to the populations for which the product or practice is intended: Evidence that the product or practice has been tested widely enough and under sufficiently diverse circumstances to give assurance that the effects claimed may be similar when the product or practice is used elsewhere for the populations intended.

Source and Level of Funding of Intervention		
	INSTALLATION (Non-recurring Costs	SUBSEQUENT YEARS (Recurring Costs)
Personnel		
Personnel Training		
Equipment & Materials		
Consumables		
Other Costs* - Specify:		
_____		
_____		
_____		
TOTAL		

* E.g., transportation, technical assistance, public relations, etc.

Figure 1. An illustration of a table shell for showing costs.

JDRP Criteria for Judging Effectiveness

The Joint Dissemination Review Panel has received requests for a statement of the "cutting points" on the criteria used in reviewing projects. The Panel has been unwilling to set forth precise specifications. The decision as to whether the evidence of effectiveness on any particular product or practice justifies use of Federal funds to promote dissemination is not automatic or mechanical. This decision involves judgment about the educational signifcance of the claimed effect and the credibility of the evidence supporting the claimed results. A decision that the evidence is not convincing is usually not due to a single fatal flaw, but to a failure of plausibility on several criteria.

The Panel believes that setting up highly specific standards relating to educational significance (e.g., the importance, number, magnitude, durability, and consistency of positive effects and their comparative advantage) and credibility of the supporting evidence (e.g., objectivity, reliability, validity, generalizability and causal nature of the data) would degrade rather than improve the review process. The Panel has felt, for example, that it would be irresponsible to assert that projects achieving a gain of 1.0 grade equivalent units should be accepted while a gain of 0.9 grade equivalent units should be rejected; or that a sample size of, say, 50 is acceptable, whereas a sample size of 49 is not.

It is because a complex judgment on plausibility is required--one that takes into account all of the evidence--that the Joint Dissemination Review Panel is needed. Past experience indicates that leaving the judgment of what is acceptable up to each Education Division program produces variable and questionable results. On the other hand, developing a manual of boiler-plate standards would entail the arbitrariness cited above.

Some Guidance

All this may be true, but acknowledging it may not provide the guidance which Education Division program staffs need in order to identify products or practices which have a high likelihood of being approved.

The purpose of this section is to set forth in a general way, but in greater detail than is furnished in the Form for Submitting Materials in the Joint Dissemination Review Panel, the kinds of criteria the Panel uses in assessing the effectiveness of the products or practices submitted to it. This should provide program staffs with better guidance for selecting potential exemplary materials and methods, and for preparing submissions to the Panel.

Many of the products and practices submitted to the Panel have been in the area of compensatory education, environmental education, reading, mathematics, bilingual education, and other similar areas of cognitive achievement or affective gain in individual elementary and secondary students. The criteria discussed below as illustrative relate mainly to these kinds of submission.

Perhaps the best way of making clear the kinds of criteria the Panel uses in reaching its judgments on effectiveness is to set forth a series of general, common-sense questions. The questions focus on three issues: (1) Is there evidence that anything important happened that is consistent with the stated claims? (2) Is there evidence that what happened is generalizable? and (3) Can this credibly be attributed to the product or practice?

1. How well did the learners perform before they were subject to the product or practice in question, and how well did they perform after experiencing it? As an example, are there measures taken before and after the learners experienced the innovation which show that they gained or improved?

2. Are the gains statistically reliable?

3. If there is evidence of change or improvement, is the gain large enough to be meaningful? That is, is it large enough to be both statistically reliable and educationally significant? Many submissions show apparent before-after mean changes in the expected direction, but they are either not statistically reliable or, even if statistically reliable, are too small in size to constitute meaningful educational improvement judged against commonly available experience.

4. Is there evidence that the improvements registered by the product or practice are stable and generalizable to other school settings? Or does it appear that they may be the result of special characteristics of the particular group of students who happened to use the product or practice when it was evaluated, or the unusual competence of the teacher who used it? These considerations are acute when the number of learners is small or where there is only a single use of the product, i.e., where the evidence is based on one teacher and one classroom. Thus, it is desirable, when the number of cases is small, for there to have been multiple replications of the practice (e.g., different classrooms, different teachers, different schools, or different years).

5. Once it has been established that there have been gains, that they are large enough to be statistically and educationally meaningful, and that they are generalizable beyond the originating site, the central question remains: Can we be reasonably confident that the gains can be attributed to the innovation described in the normal maturation, to the regular education process, or to other special factors which may be affecting the students? In order to provide some kind of answer to this crucially important question, submissions to the Panel should include some measure or estimate of what would have happened to the students if they had not been using the product or practice. One of the best ways to do this usually, is through a control group, but the Panel has approved many projects which did not include a control group because the evidence of effectiveness contained some other persuasive measure or estimate of the effects on non-treatment. For example, comparisons of recent gains with previous year's scores or national norms often provide persuasive evidence that unusually large gains recorded can reasonably be attributed to the product or practice. Another example is time series comparisons against a baseline time period. In many cases, however, simple before-after data on the user groups are likely to be ambiguous when there are no parallel data on a comparable, untreated control group.

   The idea is to provide evidence ruling out rival hypotheses (factors which may be responsible for producing the effects attributed to the product or practice). Examples of rival hypotheses are:

   * maturation--psychological or physiological changes in the users.

   * history--events or administrative procedures which occurred in addition to the product or practice.

   * selection/differential attrition--when comparison groups are unequal on the relevant measures at the beginning (due to selection) or at the end (due to differential attrition).

   * statistical regression--e.g., when groups which are selected for their initial extreme scores on a given measure fall closer to their population mean score on retesting with the same measure.

   * test effects--increases in test scores due to the learning that results from frequent use of the same test, or to teaching to the test.

These are the main criteria by which the Panel tries to assess the evidence of effectiveness presented for products or practices. It is not possible to specify the precise point on any of these criteria which categorically differentiates acceptable from un-acceptable submissions. Using all these criteria and examining all the evidence,the Panel tries to render judgments which, on one hand, will screen out those submissions whose evidence of effectiveness is not strong enough to support a federally funded dissemination effort, and on the other, will insure that those products and practices where there is such evidence, get moved into a wider process of dissemination which ultimately can improve education.

Other Kinds of Outcomes

It was noted above that these illustrations apply most appropriately to innovations directed at improving the achievement of elementary school and secondary school children. The illustrations discussed above would in many cases be quite inappropriate. The Education Division carries out a much wider variety of educational activities. Some activities seek to change attitudes or impart information. Others are aimed at bringing about changes in institutional procedures, at persuading state and local governments to adopt certain techniques, or at altering the ways in which state or local monies are spent. Still others seek to expand the pool of competent educational practitioners through innovations in inservice or inservice training.

In all these cases, quite different outcome measures and evidence of effectiveness will be required. However, the same general logic implicit in the questions listed above apply to these products and practices as well: Is there persuasive, objective evidence that things are different after using the product or practice than they were before? And can we be reasonably confident that any such changes or improvements noted can be attributed to the effects of the innovation described rather than to something else?

Prereview Concerns

JDRP's primary responsibility is to judge the effectiveness of submitted products or practices. But prereviews before presentations to the Panel also serve as an additional opportunity to assure that other screening criteria which are the responsibilities of the Education Division's programs are met. As discussed in the first two sections of this paper, the Panel is concerned that the products or practices whose effectiveness is to be reviewed are clearly identified, that common implementation problems are described, and that full start-up and operating costs are presented so that schools interested in selecting the innovation will do so without misunderstanding its costs. Other federal concerns include social fairness and possible harm to users. All of these must prereviewed by program offices.

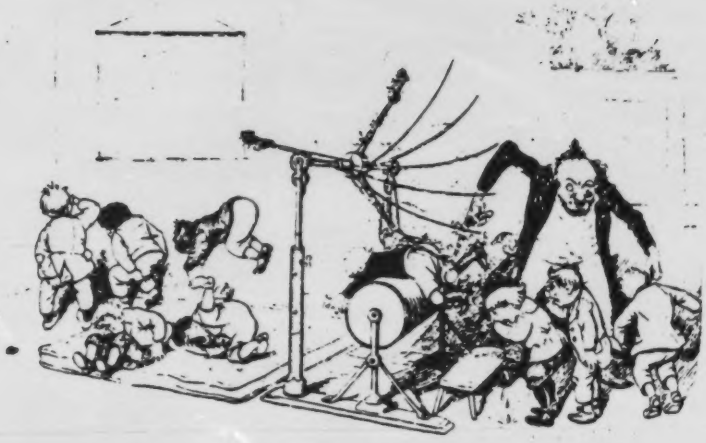
Many other concerns for "good" products have been suggested. These include the conceptual soundness of the product or practice, the quality of the developmental process, acceptance by educators, the uniqueness of the submissions, how professional the materials look, and enthusiasm of parents and students.

The Panel regards these considerations as important. Program offices are encouraged to prereview project submissions to the Panel on all such criteria. Nonetheless, the Panel's sole function is to review only one category of criteria that may be considered before dissemination: evidence of effectiveness. This may be considered a fairly large task by itself. Adopters should recognize, however, that JDRP only decides whether persuasive evidence of effectiveness consistent with the claims and goals has been presented. The product does not have a "universal seal of approval" from the federal government: this is not the Panel's function.

APPENDIX A

OPERATIONAL DEFINITIONS OF NIE CRITERIA

FOR REVIEWING EDUCATIONAL PRODUCTS



Operational Definitions of Criteria*

The term "criteria" has been used in the study to denote the standards, guides, rules and issues of concern of decision-makers used in the process of reviewing and selecting instructional products. Operational definitions of criteria should identify the connotations of the term criteria, i.e., the parameters, usages and functions. It should be possible to determine what is and is not included in a criterion on the basis of its operational definition, and thus, to make a decision as to whether that criterion is or is not met by the product.

The constraints noted in a previous section of the chapter were intended to preclude the possibility of operationally defining criteria in such a way as to ensure their general acceptability. The criteria can be defined only as they are used in the product review instrument of this study.

Desirability

Need

Schermer (1975, p. 4) defines "need" for a product as ". . . the social and educational significance of the . . . product, the size of the target group, and the priorities of the reviewing agency." This definition is applicable in the present study.

Demand

Demand will mean that there is evidence that the product was developed as a result of consumer-identified (as opposed to sponsor/developer-identified) need and request. In reviewing the product, the scope and universality of the product should be considered.

Demand will also mean that the product has high marketability as evidenced by the dissemination and diffusion of the product. Consumers are willing to purchase the product.

Appropriateness to Users

Appropriateness for the user is the degree to which the product meets the needs of learners/users in terms of the product's instructional intent, its match with the age, grade and ability level of the target group, how well it integrates with the on-going instructional program, and the extent of its compatibility with the general educational objectives of the local setting.

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* Clark, Carolyn. Report on a Codification and Analysis of Assurances, Claims and Evidence to Support Claims in NIE Sponsored Educational Products, 1975. U.S. Department of Health, Education and Welfare: National Institute of Education, October, 1976.

Appropriateness to Community

Appropriateness for the community is the degree to which the product is compatible with the instructional, social, moral and spiritual values of the local community. Issues such as citizenship, patriotism, respect for the free enterprise system, respect for authority, etc., may be considered among these values.

In the desirability cluster, two of the criteria--need for the product and appropriateness to users--seem essential and may outweigh issues related to appropriateness to the community if, should controversy arise, it can be shown that need and user appropriateness are met by the product better than anything else available on the market. Demand, as defined here, is least essential and can only be valued in conjunction with at least one other criterion.

Practicality

Cost

Cost of the product must be judged on the basis of available resources of the decision-maker, the relationship between cost and effectiveness of the product, and the advantages of the product when compared with similar other products. Costs are interrelated with other criteria such as training, availability, durability and replicability of the product. Costs depend also upon per student use.

Ease of Use

Ease of use is evaluated in terms of the clarity and specificity of tasks associated with implementation of the product for teachers and learners; the interrelationship of the product with other learning and instructional tasks and programs; and the satisfaction realized by users of the product under normal instructional conditions.

Training Requirements

Consideration of the training requirements of the product should include the cost in personnel time and availability, the relationship of the need for training to the quality of implementation, and the independence of the training program from the developer or other external agents.

Preparation Time

Preparation time, i.e., time required outside the classroom or other instructional setting, for grading, setting up activities, managing equipment, etc., should be minimal, and should not detract from time scheduled for other prep-time responsibilities of the implementer.

Availability

Availability of the materials, equipment or training necessary for implementation of the product must be assessed in terms of the ability of developers or publisher to meet user delivery deadlines, to replace or repair failing materials or equipment, and to adhere to agreed upon costs and quality of the product.

Durability

Durability of the product is defined by Coller (1976) as the extent to which the product has continuance, in the sense of not soon becoming obsolete, sturdiness in the sense of enduring hard use, and perpetuality in the sense of being easy to update so that it has lasting utility.

Support Staff

The need for support staff, such as clerks or paraprofessionals, has implications for cost, training and ease of use of the product, and should be assessed in terms of current staff resources and the relationship of staffing to implementability of the product.

Adaptability

Adaptability is defined by Coller (1976) as the extent to which the product can be easily changed to fit better the institutional conditions of the consumer without losing any of its essential qualities and/or effectiveness.

Replicability

Replicability is the extent to which the user must adhere to strict implementation standards in order to achieve the intended outcomes of the product; and the extent to which it is possible to achieve those outcomes without the participation or intervention of the developer or other external agent.

In the practicality cluster, the most essential criterion is the cost of the product and concomitant issues of training, durability, availability and adaptability.

Social Fairness

For purposes of the study, the social fairness product review criteria relate to the qualities of the product in terms of fairness, balance and/or affirmative treatment of women and minorities. These features of the product can best be assessed by careful review of the product itself, though information about the product can provide basic screening guidelines. Characteristics to be reviewed are the use of language when referring to races, nationalities, religions, the sexes and so forth.

Intrinsic Qualities

Choice and Accuracy of Content

Content issues require careful product examination. Content issues include issues previously addressed under desirability, such as the appropriateness of the materials for the target group's age, grade and ability levels. The reviewer is concerned about the breadth of the content in terms of its currency. Content issues include the treatment of current social, technological and scientific developments as they relate to the specific subject matter.

Instructional Methods

The instructional method should account for individual learner differences as well as be appropriate to the content. The method of instruction should allow easy implementation as well as adaptation. The scope and sequence of the materials should be clear, as should be the learning tasks. Evaluation procedures to be used by students should be clearly defined.

Educational Principles/Philosophy/Value Orientation of the Product

This criterion is one which may be of more interest to the community than to the students. It is an important criterion when screening or reviewing products for classroom use. For purposes of the study, the criterion will be documented rather than evaluated.

Clarity of Objectives

It is useful to have clearly stated instructional objectives from the developer/producer. The task of determining the appropriateness of the product to the setting is aided when the objectives are clearly stated. The objectives of the product will related to choice of content and appropriateness of the instructional design.

Aesthetic Appeal

This criterion covers issues of the physical quality of the product, the format, design and typology as well as the use of language, grammar and sentence structure. The aesthetic appeal issue should reflect the opinions and attitudes of students about using the product.

Developmental Design

This criterion relates to instructional methods, objectives and aesthetic appeal of the product. The design of the product should reflect care in the development of the content without calling attention to the design itself.

The social fairness and intrinsic qualities criteria both require examination of the product itself or careful documentation of the outcomes of usage, as in evaluation reports or learner verification and revision procedures. Judgments about these two clusters should be made on as much "hard" data as possible.

Learner/User Effects

For this criteria cluster, the reviewer must rely on data from external sources initially, since the product has not been used previously in the particular setting. Sources of such data include user reports, product catalogs and brochures from developers and publishers, or sponsors, etc. Ideally, a costly product is pilot-tested in a setting comparable to that of the intended users.

Under the learning effects cluster, unintended positive or negative side effects should be evaluated as well as the intended cognitive, affective, psycho-social, or psycho-motor effects. Integral to the examination of effects of the product is the analysis of the data describing these effects.

Evidence of Product Effectiveness

This criteria cluster addresses the issue of determining the effects realized and expected of products as well as assessing the credibility of the evidence provided to document the product's effectiveness.

Coller (1976) defines effectiveness as follows:

> To determine the relative desirability of the product/process in terms of the nature of effects, in respect to sum of effects and quality of effects; potency of effects, and meaningfulness of effects; cost/effectiveness, in respect to the ratio of the magnitude of effects to real costs, and interactive effects or, those effects that occur where the product/process comes into contact with a moderating variable.

In other words, in assessing effects the reviewer must consider the nature of the effects, i.e., the cognitive, psychomotor, social and affective effects, realized by the product; the objectives sought by the user in selecting the product; the cost related to achieving the effects; the duration of the effects and the interactive effects.

Schermer presents the following criteria for assessing effectiveness: 1) strength of the effect, i.e., how well does the product meet its stated goals and objectives; 2) long term effects such as impact and retention of learned matter; 3) comprehensiveness or number of effects, 4) scope of the effect, i.e., how widely does the effect reach; 5) comparative effectiveness in terms of competitive products or alternative methods of achieving the user's objectives; and 6) efficiency of the use of learners' time. (Schermer, 1975, pp. 54-56.)

With these compatible criteria in mind, the product review instrument of the study will examine the kinds of outcomes intended by the product in terms of cognitive, affective, social and psychomotor effects; document the kinds of tools, procedures and strategies used by developers to establish the nature and level of their effects; and judge on the basis of the data provided whether the results achieved under test conditions are generalizable to other target groups, whether they can be attributed to the product as opposed to other intervening variables, and whether the results have been objectively measured.

Careful Product Development

Design/Development Procedures

The criteria in this cluster relate to developer/publisher and sponsor responsibilities for using their expertise to develop quality products for use in the education market. Design/development procedures should be of such quality as to ensure their effectiveness to users. While methodology of research, development and evaluation in a linear progression may not be relevant to the consumer in terms of know-how, nor to developers in terms of time and resource constraints, the fundamental issues of adequate conceptualization and design of the product remain important. The intrinsic qualities of the product depend upon it. Data from developers about the procedures they have employed should be used by reviewers as an effective gage of the adequacy of the product design.

Formative and Summative Evaluation

The present study will document the evaluation activities of products included in the study. Formative evaluation will include formal and informal data-gathering which provides feedback to developers for the purpose of improving products. Summative evaluation is conducted by the developer, the sponsor, the publisher or the consumer after the product has been completed and out of the hands of the developer. Data from such evaluations should provide information about the use of the product under normal field conditions, i.e., about the generalizability of the product.

Learner Verification and Revision

In some places LVR has become a requirement for the adoption of products. The product review instrument will document the number of R&D products which have undergone that process.

Expert Reviewers

This criterion is included to determine whether the product has undergone a technical review using outside, qualified experts to judge the quality of the product during the formative stage of development.

Independent Evaluation

Like summative evaluation, this criterion assesses what has been learned about the product from persons other than the developer.

The issues under careful product development are included to document the kinds of procedures being used to determine the effectiveness of lab and center products. Few users have demonstrated an interest in the process of product development; however they are concerned with the outcomes. Developmental procedures are mainly of concern to developers and their sponsors.

APPENDIX B

CRITERIA FOR SUBMISSION OF EDUCATIONAL MATERIALS

TO

EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) CLEARINGHOUSES

GUIDELINES AND RATING SCALE FOR EVALUATING DOCUMENTS

Attached is a 10-point rating scale used by the Clearinghouse director to evaluate and decide the disposition of documents acquired by the Clearinghouse. The rating scale also assists potential contributors in selecting documents for submission to the Clearinghouse. The rating scale is based on three principal criteria: *appropriateness*, *accessibility*, and *significance*.

The first of these, *appropriateness*, is dealt with in the ERIC/CEM scope-note:

> We define educational management to include all aspects of the administration, governance, and structure of public and private educational organizations at the elementary and secondary levels and the provision of facilities for their operation. We intend to acquire relevant documents and journal articles that bear upon the theory of practice of administration and governance and that are generated from the fields of educational, public, and business administration and from the humanities and the social and behavioral sciences.
>
> Topics covered include social, technological, political, and legal context of the organization; state and federal programs and policies; methods and varieties or organizations, including various grade organizations, traditional and alternative schools, and rescheduled school year plans; the tasks and processes of administration, encompassing policy development and long-range planning, finance, business management, law, public relations, staff personnel administration (e.g., collective bargaining, evaluation, affirmative action), pupil personnel administration, conflict management, curriculum development, computer applications (e.g., data processing, simulation models), and quantitative methods (e.g., operations research, systems analysis) physical environment, including facility planning and design, construction, equipment and furnishings, and maintenance; and preservice and inservice preparation of administrators.

The Clearinghouse seeks for its collection not only typical research reports with their hypotheses, procedures, and findings, but also published and unpublished conference papers, speeches, essays, curriculum guides or studies, announcements of research in progress, interim project reports, books, bibliographies, and other works of value for school administrators, professors, researchers, and the public.

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*ERIC Clearinghouse on Educational Management, University of Oregon, Eugene, OR.

The second criterion, *accessibility*, must be considered at almost every level of the rating scale. One of ERIC's primary objectives is to make high quality material widely available as soon as possible. For a number of reasons, much good material remains unpublished, or is published in local or state journals with limited distribution, or is not published for several months, even years following completion. Submission of materials to the Clearinghouse to be distributed through the ERIC Document Reproduction Service (EDRS) is one solution to this problem in the field of educational administration. The Clearinghouse also obtains for its local files all relevant materials that are widely disseminated through traditional channels. These documents are annotated and indexed at the Clearinghouse and provide a resource pool for the preparing of its information analysis products.

Significance cannot, of course, be measured quantitatively without a much more sophisticated and detailed apparatus than is available. However, it can be recognized; the director uses his experience and substantive expertise to assign rankings to these documents.

Rating Scale for Evaluating Documents*

1. *Reroute* to another clearinghouse. Not relevant to the domain of this Clearinghouse.

2. *Reject.* Materials of nonprofessional standard, appearing careless, naive, or the like; or an inhouse report so limited in scope or application that it would not be of interest to anyone outside the author's school, district, or state.

3. *Reject.* Personal reminiscences, abstract generalities, or the like. Perhaps entertaining, but contains little information.

4. *Reject.* Although not really a good piece of work, it does have some features (e.g., procedures, data) which could be of value to later researchers.

5. *Reject.* Good work, but nothing new; a replication of previous well-known work; findings reinforce those of prior research.

6. *Reject.* Good work, but the topic is of interest only to certain highly specialized members of the profession.

7. *Reject.* Very good and of wide interest, but appearing in a high-visibility journal (i.e., a journal of high national circulation presumably available to the majority of school administrators or professors).

8. *Accept for RIE.* Good. Although a replication of previous work, findings differ from the earlier ones, or reinforce them for a different population. Low visibility.

9. *Accept for RIE.* A major new research project and/or a major contribution to thought or knowledge of the field, but not yet published in a high-visibility journal.

10. *Accept for RIE.* Because of its broad significance, this material should get the widest possible dissemination.

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*"Documents" include not only the research projects, but also conference papers, speeches, essays, curriculum guides and studies, research or progress analyses, books, bibliographies, and other works of value to school administrators, professors, researchers, and the public.

SUBMITTING DOCUMENTS FOR INPUT TO ERIC - SOME GUIDELINES FOR AUTHORS

The ERIC system is designed to collect, index, and microfilm educational documents of use to teachers, administrators, researchers, and scholars. Many of the documents are not available from any source other than the ERIC system. The documents come in many different sizes, formats, and forms, from Ditto and Xerox copies to printed material. In dealing with the wide variety of documents which are submitted to the system, various reproduction problems are met which limit the readability and value of a number of these documents. In some cases, documents cannot be accepted into the system because of these reproducibility problems.

Input to the system must be carefully monitored if a reasonable quality of document readability is to be maintained. A few basic fundamentals, if applied, can substantially enhance the overall quality and usefulness of the ERIC data base. Document producers, authors, and those submitting materials to ERIC, are advised to keep in mind the following principles:

1. PAPER

   a. Weight of paper should conform as nearly as possible to that usually acceptable in business typewritten media. Medium weight bond or reproduction paper stock of 16 to 20 pounds is ideal. Use of onion-skin and other flimsy or transparent types of paper should be avoided.

   b. Color of paper should preferably be white or a light tint, but should not include the darker shades or solid colors such as red, purple, orange, brown, blue, etc. Colored papers that reduce the contrast between the print and the background will not microfilm well.

   c. Size of paper is ideal when it is 8-1/2 x 11 inches. Larger sizes and foldouts will often create the need to make overlapping, multiple images of each page, with resultant viewing difficulties for the reader.

2. TEXT

   Text of a document should be oriented, whenever possible, parallel to the short dimension of the paper.

3. TYPE SIZE

   To insure acceptable reproduction in both microfiche and hard copy, minimum type size should be 6-point type. In this size type, the height of the lower case letter "e" is approximately 1.6 millimeters. This is about the thickness of a five-cent piece. The type font of a standard typewriter, pica or elite, is well above the minimum acceptable size. Extremely narrow lines in drawings or type do not reproduce well and should be avoided.

4. TYPE DENSITY

It is important that the density or "blackness" of the type be as great as possible. Original copies rather than copies should be submitted. In some cases, where the typewriter ribbon is old, even an original copy may be faint and may not reproduce well. In this special case, a Xerox copy may improve the type density. Purple "Dittos," colored inks, and blueprints, in general, will not reproduce satisfactorily.

5. APPENDIX MATERIALS

Because appendix materials are frequently reproduced from other sources, care should be taken to see that these materials are legible and meet the standards discussed above. If appendix materials are marginal, consideration should be given to omitting the questionable material.

APPENDIX C

SPECIMEN JDRP SUBMISSION:

San Diego State University Teacher Corps Project

SYSTEM FOR INDIVIDUALLY GUIDING MASTERY ATTAINMENT

(SIGMA)

Approved by the JDRP on 8 May 1979

PROGRAM AREA: Teacher Corps — Competency-Based Teacher Education

PROJECT TITLE: SIGMA — System for Individually Guiding Mastery Attainment
San Diego State University, San Diego, California

DEVELOPED BY: Staffs of Cycle VI and VIII — Teachers Corps Projects

SOURCE AND LEVEL OF FUNDING: (The following are IHE budget totals only.)

U.S.O.E. Teacher Corps Cycle VI	$219,482
U.S.O.E. Teacher Corps Cycle VIII	$260,414

YEARS OF INTERVENTION DEVELOPMENT:
The development and field-testing period was 1971 through 1975.

BRIEF DESCRIPTION OF INTERVENTION:
The objective of this intervention was to develop, field-test, and evaluate a 31 credit hour, two semester, competency-based, preservice elementary teacher education program. The program was to be individualized through modules (learning packages), personalized, team taught, and organized by flow charted competencies rather than courses.

Context and Students Served:
San Diego State University is a large urban university where most students do not live on campus. The Department of Elementary Education is the largest of seven departments in the College of Education and employs approximately 40 full-time faculty. While there are a growing number of minority students in elementary education, the great majority are white, middle class females. Student teaching experiences are arranged so that each candidate is placed at least once in a racially or ethnically different environment.

Program Description:
The content objectives of the SIGMA program are the same as those approved by the California State Commission for Teacher Preparation and Licensing for all other elementary credential sequences at San Diego State University. However, the organization and delivery of instruction is radically different. The content emphasis is not identified as course work, but flow-charted into a skills development sequence intended for the most part to impart generic teaching skills transferable to all settings. The selection and sequencing of these skills requires that the content be highly integrated, not only horizontally, but vertically between skill strands to establish prerequisites and interrelationships.

Objectives generated from the identification of skill areas are of four types: knowledge, performance, consequence, and affective. A concerted effort is maintained to demand actual performance in realistic teaching situations. Since decisions on program development are made as a faculty team, duplications or omissions of content such as might be found in a typical series of courses are eliminated.

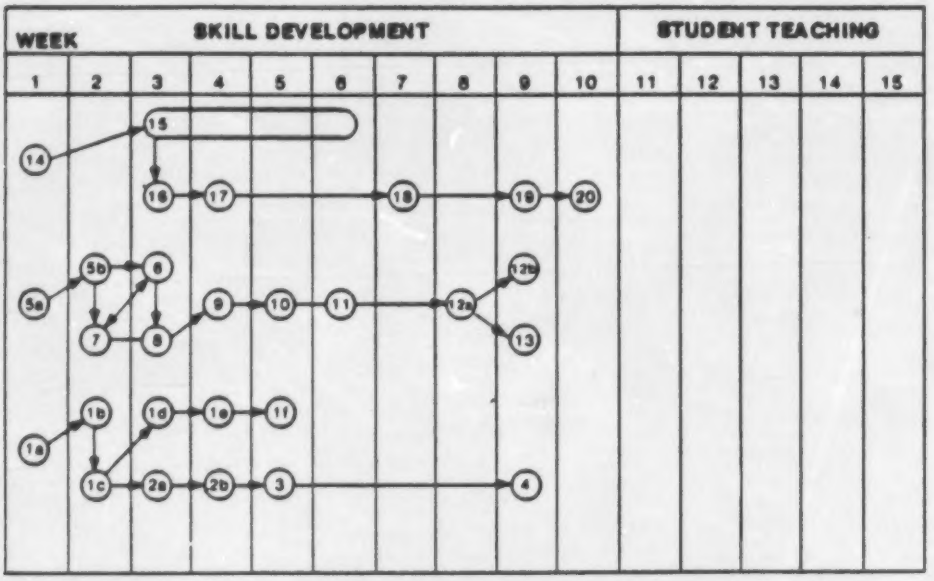
Modules are used to individualize the program so that students move through the skill development strands at their own pace. Each module incorporates six characteristics:

1) behaviorally stated objectives including terminal behavior, assessment conditions, and criterion level;
2) behaviorally stated prerequisites for each module;
3) a preassessment based on the objectives;
4) a variety of learning alternatives teaching to each objective;
5) a postassessment based on the objectives; and
6) a provision for remediation if exit criterion is not met on any objective.[1]

This instructional delivery system utilizes 28 modules in the fall semester and 15 in the spring semester, and enables the student to attain objectives in a variety of skill areas. The student, through conferences and small group meetings, is assisted by instructors to successfully complete the module requirements. Each student is assigned to an on-site classroom in which the performance required by each module is evaluated in a realistic educational setting. A concurrent seminar is conducted throughout each semester to provide continuity and large group interaction, and to allow for further instructor input as needed.

1

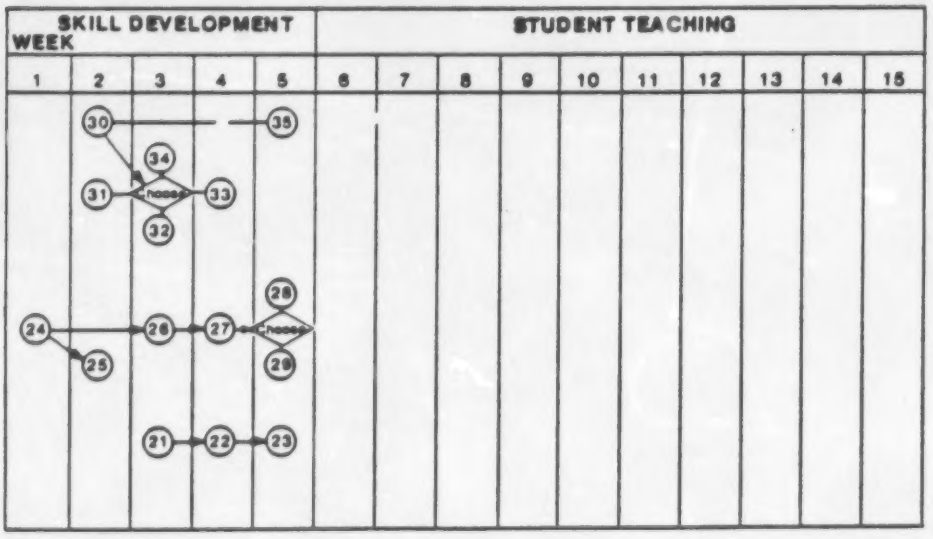
The following figures depict the module sequence in each of the semesters of SIGMA.



MODULES

1a	Competency-Based Instruction
1b-f	Instructional Objectives
2a-b	Reinforcement Techniques
3	Motivation Techniques
4	Retention Strategies
5a-b	English as a Language System
6	Language Acquisition and Usage
7	Handwriting Proficiency
8	Vocabulary Development
9	Children's Literature
10	Children's Interests
11	Oral Reading
12a-b	Decoding Skills
13	Comprehension
14	Social Development
15	Interaction Skills
16	Intellectual Skills
17	Community Study Skills
18	Questioning Skills
19	Concept Development
20	Inquiry Process

FIGURE 1
Flow Chart for Skill Development and Student Teaching - First Semester (15 Weeks)



MODULES

21	Reading Diagnosis
22	Reading Approaches
23	Reading Materials
24	Educational Accountability
25	Educational Measurement
26	Long Range Planning
27	Organizing for Instruction
28	Learning Stations
29	Writing a Module
30	Creativity
31	Creative Dramatics
32	Creative Composition
33	Creating with Art
34	Creating with Music
35	Role Playing

FIGURE 2
Flow Chart for Skill Development and Student Teaching — Second Semester (15 Weeks)

The method and organizational system when compared to the normal programs requires a number of modifications in the roles of all participants. The students are required to assume much more responsibility for their own learning; the university instructor is relieved of much of the task of information delivery and becomes a manager, counselor, and facilitator; the cooperating classroom teacher becomes pivotal in providing opportunities for classroom experiences which help students bridge from theory to practice. The highly personalized approach to instruction and the creation of a noncompetitive learning environment results in the development of cooperative group behaviors. The positive group feeling creates an esprit de corps that keeps motivation high during the entire year.[2]

Organizational structures chosen to deliver the model involve a campus-based learning center and field-based laboratory. Campus facilities were provided in the form of an Individualized Study Center (ISC) to support the model with print, audio, and video media.[3] The SIGMA faculty team normally consists of five university faculty who work with a group of about 30-35 student teachers all year and are responsible for all skill development requirements and on-site supervision.

Criterion-referenced assessments based on behaviorally stated objectives are used to evaluate student teachers. The criteria stress attainment of mastery, and modules provide for remediation in order to reach that level. Should a student not attain mastery he/she is provided with the opportunity to remediate the specific weakness which the instructor diagnoses. In most instances, all that the student needs in order to achieve mastery is more time to study or practice. If remediation is still needed at the end of a semester, the student is given a grade of "Incomplete."

Evaluation of full-time student teaching is highly correlated with the modular part of the program. During the first semester's field experience, each student is evaluated on the ability to integrate the previously developed competencies into his/her performance while working with a group of children. During the second semester, full-time field experience, each student and cooperating teacher identifies the objectives that the student will try to accomplish with the children in the assigned classroom. The student develops and negotiates a contract with the cooperating teacher and university supervisor which specifies certain desired *consequences* from working with the children. The final evaluation is based on the student's demonstrated effectiveness in fulfilling this accountability contract.

In order to make SIGMA a regenerative program, responsive to students and changing perspectives, both summative and formative data are collected periodically.

EVIDENCE OF EFFECTIVENESS:

In the 1974-1975 school year Donald F. Enos collected data on the SIGMA program and a control group, and in 1975-1976 he did a follow-up study of employed graduates of both programs, analyzed data, and documented the results.[4] He was assisted with data collection from time to time by graduate students from San Diego State. However, none of those involved in conducting the research were at any time involved with the development or implementation of the SIGMA program. Additionally, no member of the SIGMA faculty team or any other faculty or students were involved with the specification of hypotheses, data collection, analysis, or reporting results and conclusions.

The SIGMA program (N=33) was conducted by three faculty plus two student teaching supervisors while the control group program (N=40) was run by twelve faculty and six supervisors. The treatment for the control group was the regular instructional program in elementary education consisting of a foundations course and several methods courses in a variety of subject areas. The number of credit hours in each program was equal. Control group students were taught mostly through lecture and discussion, and evaluations were of a norm-referenced variety.

It was not possible, because of administrative constraints, to randomly assign student teachers to the two programs, but it is believed that the groups were comparable since students were not selected especially for either program. All were enrolled on the basis of the regular registration procedure used by the Department of Elementary Education. Additionally, no significant differences were found when comparisons of pre-enrollment interview ratings, GPAs, or numbers of men and women were made for the two programs. It should also be noted that students were observed to be more reluctant to enter the SIGMA program since it was an unknown and, in fact, the SIGMA block was the last to fill at registration out of a total of eight blocks available. As a result, it is believed that the two groups of students were as equivalent as they would have been had it been possible to make random assignments.

Claims of Effectiveness:
Evidence of effectiveness will be presented in four areas. When compared with a control group, the SIGMA program:

1. Demonstrates a significantly greater level of student knowledge on an examination of the competencies approved for elementary education at San Diego State University by the California Commission for Teacher Preparation and Licensing.
2. Demonstrates significantly better student teacher verbal interaction with children as measured by the Reciprocal Category System, both during the certification programs and in a follow-up study of employed graduates.
3. Demonstrates significantly more use of individualized instruction by student teachers when working with children as measured by the Descriptive Observational Record for Individualized Instruction and the Individualized Instruction Inventory, both during the certification programs and in a follow-up study of employed graduates.
4. Demonstrates significantly higher ratings of student teacher performance by the children taught as measured by the Student Evaluation of Teacher Instrument, II, both during the certification programs and in a follow-up study of employed graduates.

Claim of Effectiveness 1: When compared with a control group, the SIGMA program demonstrates a significantly greater level of student knowledge on an examination of the competencies approved for elementary education at San Diego State University by the California Commission for Teacher Preparation and Licensing.

In order to assess student knowledge in both SIGMA and control groups, an examination was developed by Dr. Donald Enos from the program objectives contained in the Department of Elementary Education Program approved by the California State Commission For Teacher Preparation and Licensing. All of the various block programs within the department are directed to teach to these same objectives. Kuder-Richardson formula 21 reliability was found to be 0.79 for the exam.

A significant difference favoring SIGMA was found between the two groups on this examination at the .001 level for both the fall and spring semester. A significant difference at the .001 level was also found on the composite analysis for the 1974-1975 academic year (see Table I). The SIGMA student teachers were able to demonstrate significantly greater attainment of the objectives specified in the Department of Elementary Education's approved program.

TABLE I
Results for
Student Knowledge Assessment of Teacher Education

SEMESTER	SIGMA (N = 33) MEAN	SD	RTE (N = 40) MEAN	SD	df	t
Fall	11.91	2.01	5.50	2.72	71	11.25*
Spring	10.33	2.99	6.95	4.41	71	3.52*
Year	22.24	3.88	12.85	5.37	71	11.89*

** Significant difference in favor of SIGMA at the .001 level.*

Claim of Effectiveness 2: When compared with a control group, the SIGMA Program demonstrates significantly better student teacher verbal interaction with children as measured by the Reciprocal Category System, both during the certification programs and in a follow-up study of employed graduates.

The importance of good verbal interaction between teachers and students is widely recognized as important in producing a positively reinforcing environment in terms of attitudes and expectations. Studies by Flanders and others have shown significant gains in pupil achievement after working in a positive verbal climate. A summary of the research evidence by Amidon and Hough[5] finds that several reports show essentially the same thing — teachers who are more "indirect" in the Flanders system (i.e., accept feelings, praise or encourage, accept ideas, and ask questions), have students who learn more and like school better.

The *Reciprocal Category System* for verbal interaction analysis was developed by Richard Ober.[6] This system was used to code verbal interaction into the following five categories: a) Warm/Cool Ratio, b) Acceptance/Correction Ratio, c) Elicit/Initiate Ratio, d) Children's Talk/Student Teacher Talk Ratio, and e) Acceptance/Rejection Ratio. Inter-rater reliability was found to be .91 before data collection began.

Significant differences favoring the SIGMA Program were found in 17 out of 20 Chi Square tests of data on verbal interaction as measured by the *Reciprocal Category System* (see Table II). The student teachers of the SIGMA program were able to demonstrate significantly better verbal interaction with children than were student teachers in the RTE program. The differences noted were as follows:

1. The ability to provide for and personally utilize more positive reinforcement and the elimination of tension within the classroom.
2. The ability to provide a more accepting classroom atmosphere and to facilitate the development of more positive feelings within the children.
3. The ability to provide increased opportunities for children to present unsolicited facts, information, and opinions during the instructional process.
4. The ability to facilitate the children's interactions within the classroom.

TABLE II
Results for Verbal Interaction
Measured by the Reciprocal Category System

Category	Measurement Period	Ratio Achieved SIGMA	RTE	X^2	df
Warm/Cool	Year '74—'75	5.43	0.55	381.68*	1
	Fall '74	4.12	2.62	4.07**	1
	Spring '75	7.03	0.25	432.92*	1
	Follow-up '75	45.60	0.25	123.18*	1
Accept/Correct	Year '74—'75	9.73	2.11	277.18*	1
	Fall '74	8.95	1.91	158.35*	1
	Spring '75	10.61	2.52	100.39*	1
	Follow-up '75	13.33	1.03	73.58*	1
Elicit/Initiate	Year '74—'75	1.01	.79	74.46*	1
	Fall '74	1.35	1.21	2.26	1
	Spring '75	.85	.51	81.67*	1
	Follow-up '75	.68	.82	1.93	1
Student Teacher Talks/ Children Talk	Year '74—'75	1.22	1.95	533.17*	1
	Fall '74	1.44	1.91	98.48*	1
	Spring '75	1.05	1.98	506.67*	1
	Follow-up '75	1.19	1.31	1.57	1
Acceptance/Rejection	Year '74—'75	9.80	1.89	585.39*	1
	Fall '74	9.01	2.94	132.84*	1
	Spring '75	10.72	1.08	566.33*	1
	Follow-up '75	44.23	1.02	222.21*	1

* *Significant difference in favor of SIGMA at the .001 level.*
** *Significant difference in favor of SIGMA at the .05 level.*

As noted above, a follow-up study of graduates of both programs was done during fall 1975. Only six of the 40 RTE program graduates and 12 of the 33 SIGMA graduates had found employment by that time. Results from such a small sample cannot be conclusive; however, they can provide some indication as to whether or not the findings of the year-long study are maintained. It is believed that the follow-up study results help to support the validity of the conclusions of the basic study.

Claim of Effectiveness 3: When compared with a control group, the SIGMA program demonstrates significantly more use of individualized instruction by student teachers when working with children as measured by the Descriptive Observational Record for Individualized Instruction and the Individualized Instruction Inventory, both during the certification programs and in a follow-up study of employed graduates.

It had been the intention of the SIGMA developers to model a type of individualized instruction which would be emulated by student teachers in their work with children. The competency-based instructional approach is a particular type of Mastery Learning, and reviews of research on Mastery Learning by Block[7] and others have shown dramatic achievement gains by pupils. In summary, Therese M. Herman[8] concludes that research with individualized instruction of all kinds clearly demonstrates that many students who use it learn at least as well, sometimes better, and often, though not always, more quickly than they learn with other kinds of instruction.

The instruments chosen to assess student teachers' degree of individualizing were the *Descriptive Observational Record for Individualization of Instruction (DORII)* by Ben Harris and Ken McIntyre and the *Individualization of Instruction Inventory* (III) by Betty Coody and Ben Harris.[9] These instruments grouped data into the following factors: a) Intra-Class Grouping, b) Variety of Materials, c) Pupil Autonomy, d) Differentiated Assignments, and e) Tutoring. Inter-observer reliability was found to be .89 before data collection began.

Significant differences at the .001 level were found for individualization of instruction measured by DOR II and III in all but the categories of Intra-Class Grouping and Variety of Materials for the fall semester, 1974 (see Table III). The SIGMA program provided an increased number of training techniques for the student teachers in individualizing instruction within the classroom. The SIGMA program student teachers provided more flexibility and direct, task-oriented situations for children; a wider variety of available materials throughout the classroom; and greater pupil participation in planning, self-direction, leadership in groups, and individual activities. The SIGMA program student teachers also provided greater challenges in children's assignments, as well as relationship of the assignments to diagnosed learning needs, and tutoring of individuals with learning problems.

TABLE III
Results of Individualization of Instruction
Measured by DOR II and III

Category	Measurement Period	SIGMA Mean	SIGMA SD	RTE Mean	RTE SD	df	t
Intra-Class Grouping	Year '74—'75	19.12	1.74	17.36	1.89	71	4.07*
	Fall '74	18.57	2.37	18.37	2.16	71	1.75
	Spring '75	19.67	2.82	16.35	3.01	71	4.78*
	Follow-up '75	22.30	1.43	17.00	2.12	12	7.46*
Variety of Materials	Year '74—'75	17.91	1.51	14.95	1.33	71	8.93*
	Fall '74	16.58	2.09	16.45	2.05	71	0.26
	Spring '75	19.24	2.32	13.45	1.78	71	12.06*
	Follow-up '75	21.70	1.87	16.00	1.87	12	7.22*
Pupil Autonomy	Year '74—'75	17.33	1.59	15.15	1.33	71	6.39*
	Fall '74	17.24	2.11	15.35	1.63	71	4.33*
	Spring '75	17.42	2.69	15.03	1.88	71	4.46*
	Follow-up '75	20.30	0.82	15.80	1.48	12	10.00*
Differentiated Assignments	Year '74—'75	18.48	1.47	15.08	1.43	71	9.89*
	Fall '74	17.39	1.87	15.75	1.72	71	3.91*
	Spring '75	19.45	2.62	14.40	1.99	71	9.34*
	Follow-up '75	21.70	1.41	16.25	3.03	12	6.19*
Tutoring	Year '74—'75	17.94	1.89	14.30	1.73	71	8.58*
	Fall '74	17.97	3.01	15.08	2.02	71	4.90*
	Spring '75	17.91	2.72	13.55	2.43	71	7.23*
	Follow-up '75	20.60	2.00	15.00	1.58	12	7.00*
Total Individualization of Instruction	Year '74—'75	90.73	6.91	76.76	5.98	71	9.26*
	Fall '74	87.76	9.84	81.13	7.24	71	3.31*
	Spring '75	93.69	10.96	72.77	9.49	71	8.74*
	Follow-up '75	106.90	4.91	80.00	9.11	12	9.71*

* *Significant difference in favor of SIGMA at .001 level.*

While the sample size for the follow-up study is small, it does provide results consistent with those found during the earlier periods of student teaching.

Claim of Effectiveness 4: When compared with a control group, the SIGMA program demonstrates significantly higher ratings of student teacher performance by the children taught, as measured by the Student Evaluation of Teacher Instrument, II, both during the certification programs and in a follow-up study of employed graduates.

Students' attitudes toward their teacher are often used in the profession as one index of teaching effectiveness. However, according to Getzels and Jackson, research provides mixed support for a direct link between pupil attitudes and outcome measures such as achievement.[10] Even so, it is believed to be both sensible and desirable for a teacher to strive toward being liked by pupils as long as instruction quality is not sacrificed.

The instrument selected to sample childrens' attitudes was *Student Evaluation of Teacher Instrument II (SETII)* by Ruth Haak, Douglas Kleiber and Robert Peck.[11] Children's attitudes toward their student teacher were sampled for each of the following factors: a) Interactional Competence, b) Rapport, c) Stimulating, Interactive Style, d) Unreasonable Negativity, and e) Fosterance of Self-Esteem. Published reliabilities indicate that $r = .75$ for kindergarten, $t = .82$ for grades 1—3, and $r = .78$ for grades 4—6.

Each student teacher's overall performance was rated by the children they had worked with using the SETII. A grand total of 2,019 children rated the SIGMA student teachers and 2,248 children rated the student teachers in the control group. For the spring semester and the composite analysis for the 1974-1975 academic year, significant differences were consistently found favoring the SIGMA program except for the kindergarten classes (see Table IV).

Only one significant difference in favor of the RTE program was found ("Unreasonable Negativity," fall semester, grades 1-3). Subsequent investigation and analysis reversed that finding in the spring semester, 1975, and again in the follow-up study during the fall semester 1975. These analyses suggested that the SIGMA program provided better opportunities for the student teachers to be understood by the children in the classroom.

When examining Table IV, the null hypothesis must be accepted for the fall semester because there is a consistent pattern of no significant difference in children's ratings of student teacher performance. However, during the measurement periods of spring 1975 and follow-up 1975, significant differences in ratings of the children were observed favoring the SIGMA program student teachers in the areas of stimulating, interactive style, rapport, interactional competence, unreasonable negativity, and the fosterance of self-esteem.

Controls for Internal Validity:

Threats to the internal validity of the study were controlled as follows:

1. *History Effect:* SIGMA AND RTE programs were conducted in the same time period and thus were subject to the same external forces.
2. *Maturation Effect:* The use of a control group helps to limit any possible maturation effect, but there is a possibility of a Hawthorne Effect. However, the SIGMA program consists of a year of very hard, full-time work; and this combined with the results of the follow-up study tend to make it appear unlikely that a Hawthorne Effect was operating.
3. *Testing Effect:* If there were any testing effect it would have worked equally on each program group.
4. *Instrumentation:* Reliability and validity for instruments and observers were substantiated and/or maintained at high levels.
5. *Statistical Regression:* No student teachers were selected for their extreme scores.
6. *Mortality:* No students were lost from either SIGMA or the RTE program groups.
7. *Selection Effect:* Since random assignment of students to each program was not possible, there is a chance of a selection effect, but as was noted earlier students did not differ significantly in interview ratings, GPA, or numbers of men and women. Students chose the program they wished, and SIGMA was the last program to fill at registration. Due to these circumstances it is believed the groups were equivalent.
8. *Selection-Maturation Interaction:* It is believed this was controlled as noted in numbers 2 and 7 above.

TABLE IV
Results of Student Evaluation of Teacher Instrument II

Factor	Measurement Period	Grade	SIGMA Mean	SIGMA SD	RTE Mean	RTE SD	df	t
Stimulating, Interactive Style	Year '74–'75	K	9.81	0.37	10.17	0.64	24	2.24***
	Fall '74	K	10.17	0.39	9.97	0.58	11	0.89
	Spring '75	K	9.72	0.35	10.81	0.63	10	3.91**
	Follow-up '75	K	9.49	0.13	*No teachers at this level*			
	Year '74–'75	1-3	9.64	0.50	10.52	0.78	58	7.38*
	Fall '74	1-3	9.87	0.63	10.23	0.76	26	1.45
	Spring '75	1-3	9.46	0.28	10.75	0.75	14.37	5.96*
	Follow-up '75	1-3	9.36	0.14	10.58	0.41	6	8.13*
Development of Rapport	Year '74–'75	4-6	5.47	0.37	5.92	0.64	70	5.12*
	Fall '74	4-6	5.59	0.41	5.76	0.63	30.89	1.03
	Spring '75	4-6	5.28	0.17	6.03	0.63	27.16	5.34*
	Follow-up '75	4-8	5.02	0.02	6.77	2.60	2	125.00*
Interactional Competence	Year '74–'75	4-6	4.43	0.25	4.69	0.45	70	4.29*
	Fall '74	4-6	4.53	0.24	4.57	0.50	25.72	0.35
	Spring '75	4-6	4.27	0.18	4.78	0.38	33.17	5.47*
	Follow-up '75	4-8	4.09	0.01	4.94	2.22	2	70.83*
Unreasonable Negativity	Year '74–'75	K	9.32	0.69	8.86	1.11	24	1.65
	Fall '74	K	7.98	0.46	8.78	1.35	11	1.58
	Spring '75	K	9.66	0.10	8.96	0.64	3.07	2.17
	Follow-up '75	K	9.80	0.03	*No teachers at this level*			
	Year '74–'75	1-3	9.34	0.46	8.86	0.96	58	3.51*
	Fall '74	1-3	8.91	0.37	9.47	0.41	26	3.83†
	Spring '75	1-3	9.68	0.17	8.18	1.01	12.49	5.28*
	Follow-up '75	1-3	9.91	0.08	8.70	0.42	6	8.07*
	Year '74–'75	4-6	9.40	0.51	8.94	0.75	70	4.21*
	Fall '74	4-6	9.28	0.45	9.25	0.74	29.29	0.17
	Spring '75	4-6	9.58	0.58	8.81	0.74	34	3.21**
	Follow-up '75	4-8	9.66	0.34	7.97	2.82	2	19.88**
Fosterance of Self-Esteem	Year '74–'75	K	6.67	0.33	6.84	0.72	24	1.10
	Fall '74	K	7.15	0.21	6.78	0.53	11	1.87
	Spring '75	K	6.55	0.26	7.05	0.57	3.63	1.67
	Follow-up '75	K	6.39	0.04	*No teachers at this level*			
	Year '74–'75	1-3	6.62	0.24	7.09	0.22	58	5.33*
	Fall '74	1-3	6.98	0.54	6.88	0.52	26	0.50
	Spring '75	1-3	6.34	0.19	7.24	0.38	16.28	7.85*
	Follow-up '75	1-3	6.29	0.10	7.40	0.08	6	20.94*
	Year '74–'75	4-6	6.97	0.44	7.52	0.60	70	4.46*
	Fall '74	4-6	7.33	0.61	7.23	0.80	37	0.47
	Spring '75	4-6	6.41	0.28	7.65	0.75	30.75	7.11*
	Follow-up '75	4-8	6.42	0.34	8.90	2.98	2	27.87**

* *Significant difference in favor of SIGMA at .001 level.*
** *Significant difference in favor of SIGMA at .01 level.*
*** *Significant difference in favor of SIGMA at .05 level.*
† *Significant difference in favor of RTE at .001 level.*

Costs for Adoption and Maintenance:
In 1976 costs were as follows:[4]

PERSONNEL	INSTALLATION	SUBSEQUENT YEARS
1. Training Consultants	$1,225	0
2. Faculty Team	9,618	Same as Regular Program
3. ISC Supervisor	4,625	$9,250
INDIVIDUALIZED STUDY CENTER		
1. Facility Development		
a. Furniture	3,500	0
b. AV Equipment	4,250	250
c. Remodeling	4,000	0
2. Software for Modules	$3,062	150
CONSUMABLES - 35 sets of modules for students	412	Paid by Student Fee
TOTALS	$30,692	$9,650

CONCLUSIONS:
The Enos study has presented very strong support for the effectiveness of the SIGMA program and establishes it clearly as a viable alternative to regular programs of elementary teacher preparation. The study has demonstrated that student teachers completing the SIGMA program obtained the following benefits compared with student teachers completing the regular program:

1. Significantly greater knowledge about teaching and learning,
2. Significantly better verbal interaction with children,
3. Significantly greater use of individualized instruction, and
4. Significantly higher ratings of their performance from children they taught.

The outcomes of this study seem to be consistent with those being achieved with Mastery Learning in a variety of other subject matter areas.[7] Additionally, SIGMA appears to be generalizable and disseminable. It is believed that the dissemination to adopters should include careful counseling and training, systematic assembly of modular components, preparation of an Individualized Study Center, and follow-up visits from consultants. All of these requirements appear to be realistically feasible for dissemination and implementation at other sites in IHEs, LEAs, or even some county or state offices should such desire to credential preservice elementary teachers. Since most of the competencies are generic in nature, no conflict is anticipated with state laws; however, states may have additional requirements beyond SIGMA which could be handled in a traditional manner.

It is believed that SIGMA is a disseminable program which has been successful in raising the quality of new teachers entering the profession, while at the same time providing a model for teachers to emulate in working with children.

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